

AMERICAN FORESTS



JUNE 1946

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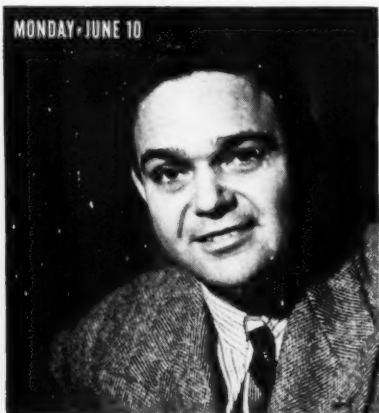
MARIAN ANDERSON
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NELSON EDDY
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MAGGIE TEYTE
BLANCHE THEBOM
HELEN TRAUBEL

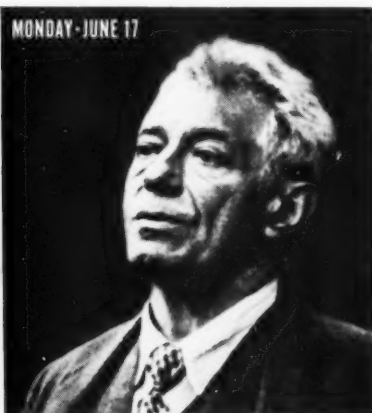
DONALD VOORHEES AND THE BELL TELEPHONE ORCHESTRA

MONDAY-JUNE 10



JAMES MELTON—One of America's favorite tenors. First New York appearance at Roxy Theatre. Metropolitan Opera debut, 1942.

MONDAY-JUNE 17



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MONDAY-JUNE 24



BLANCHE THEBOM—Lovely mezzo-soprano of the Metropolitan. Discovery followed her singing at a ship's concert while on vacation.

MONDAY-JULY 1



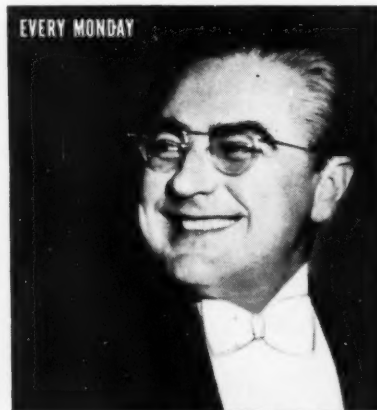
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AMERICAN FORESTS

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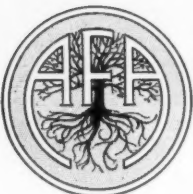
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The Purpose

The American Forestry Association is a national organization—educational in character—for the advancement of the intelligent management and use of the country's forests and related resources of soil, water, wildlife and outdoor recreation. Its purpose is (1) to bring about adequate protection and perpetuation of these resources by creating an enlightened public appreciation of the need of conserving them through wise use for the present and future welfare and enjoyment of all the people; (2) to make available to Americans in all walks of life a wider knowledge and appreciation of their forest resources and the part they can play in the social and industrial life of our nation.

The History

MORE THAN half a century ago American men and women of vision, stirred by the rapid destruction of forests and forest life in the United States, began to raise their voices in behalf of conservation. Foreseeing the danger of allowing America's rich forests and vast natural wealth to be thoughtlessly wasted, these public-spirited individuals protested the needless destruction that was taking place. Out of their efforts came a collective force — The American Forestry Association, first organized in 1875 and made a national influence in 1882.

The Record

THUS The American Forestry Association has a long record of efficient public service. The establishment of the United States Forest Service and the creation of the nation-wide system of state and national forests and parks were due in no small part to the Association's efforts. Its educational work, extending over more than seventy years, has stimulated public action and built public support for protection against forest fires and floods; for prevention and control of soil erosion; for the development of conservation policies in forest management for continuous production through wise use; for the control of forest insects and diseases and the preservation of fish and wildlife.

The Support

FROM AN ORGANIZATION of a few hundred members three decades ago, the Association has attained a substantial membership of many thousand men and women, living in every state in the Union and in foreign countries throughout the world. The funds of the Association are administered by a Board of Directors composed of individuals of national standing—men and women who give their services free, who have a practical understanding of the nation's present-day conservation needs, and are equipped through experience, ability, enthusiasm and training to advance the Association's program.

The Program

BECAUSE OF its independent, non-political character, the work of The American Forestry Association is vitally necessary in the field of public service. It provides an unprejudiced influence for the development of sound conservation measures. It helps coordinate public, state and federal policies. It cooperates closely with federal, state and private agencies in conservation work. At the same time it initiates, sponsors and carries on needed projects in conservation in addition to its regular broad continuous program of education.



My Favorite Tree

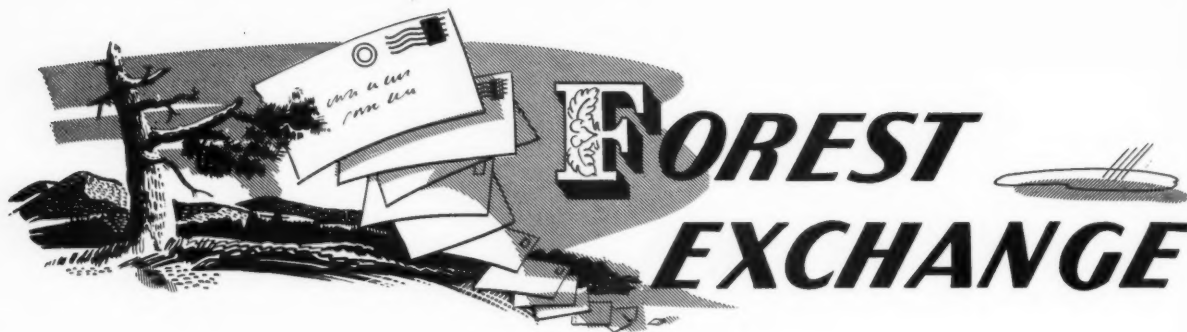
AS ONE born and brought up in New England, I love best the stalwart and handsome maple tree. Its thick, spreading foliage which casts a cool shade in summer and its ravishing, flaming beauty in the fall set it apart from all others.

The maple is companionable and truly satisfying in any season. Its dainty blossoms of lacy red and yellow are the earliest tree flowers to appear, heralding spring and welcoming the robin. Its graceful and beautiful foliage comes early and stays late, offering shade in summer quite unsurpassed for country homes or city sidewalks. No other tree enhances the brilliance of the autumn landscape as the maple. Its strength in withstanding the blasts of wintry winds stands as a symbol of hope of the future.

No other tree contributes so much to New England life as the maple. From the time of the Pilgrim Fathers to these twentieth century times, it has commanded leadership not only for its distinguished appearance but for its useful gifts to man—maple sugar and highly prized timber.

But "the glory of trees is more than their gifts". In a changing world the maple tree remains to me a most constant friend.





Sprucing Up Roadside Trees

SIR: Lately I have been watching the trees by the roadside. My conclusion is that an enormous opportunity lies before the American farmer and country home owner not only for increasing his own pride in one of his precious possessions—trees—but also of giving untold pleasure to passing motorists.

It is impossible to expect country real estate owners even in small numbers to clear up whole wooded areas along the roads. The job would be immense and costly. But in motoring around the country, I have seen a great number of isolated trees either in fields near the roadside or at the edge of a small yard or garden, which could easily be given helpful attention. Obviously, these trees are already a source of satisfaction since, owing to their size or age, they have been left standing.

I therefore suggest that all owners of isolated trees of appealing size should (a) consider cutting down surrounding vegetation in order that a clear view of the tree may be obtained; (b) take off vines and parasitical plants such as honeysuckle and poison ivy; (c) cut off dead branches and apply preservative to wounds; (d) render the trees shapely by cutting off low-growing suckers and small branches; and (e) label the trees with a simple white board with black lettering attached on the side facing the road.

In the case of most such isolated trees an hour or two's work would accomplish all the above. The pleasure and pride afforded would be very great. —*L. McCormick-Goodhart*, Hyattsville, Maryland.

Forestry by Radio

SIR: Aimed at creating a greater public respect for the forests of Texas and to provide simple suggestions to timberland owners in the handling of their woodlands, the Texas Forest Service has started a state wide radio

educational program, in which more than 40 radio stations are cooperating.

Three types of programs are being presented. They include dramatic broadcasts on episodes in Texas history which have a forestry significance; a forester interview series which contains simple how-to-do-it suggestions for woodland owners; and a forestry news flash series containing highlights of interesting items on the forestry front. As an additional service to stations, short spot news notes are furnished. —*S. L. Frost*, Texas Forest Service, College Station, Texas.

What Do You Think?

SIR: Allow me to congratulate you on AMERICAN FORESTS for the manner in which you have dressed it up. It's now a more attractive and interesting book.

However, I should like to make some suggestions: The magazine should be increased in size; one piece of fiction with a conservation theme should be run in each issue; I should like to see a page devoted to biographic sketches and pictures of the authors; also, I should like an illustrated page devoted to outdoor and nature poetry. —*John Clark Hunt*, Weaverville, California.

SIR: I have planned for some time to acquire land adjacent to my own small place in southern Wisconsin, and to cover it with a mixed wood. I should do it without much thought to harvesting a crop in future years, but just because I should like a wood of my own. I want a wide variety of trees, not lined out as in standard reforestation practice, but grouped informally with a glade here and there.

Thus I should like to suggest that you consider publishing in AMERICAN FORESTS forest-planting plans, somewhat on the order of the plans the garden magazines publish for shrubs and flowers. Plots could be

arranged to produce blossom, bird food, fall color, Christmas greens, nuts. Some could be fast-growing, some slow. Certainly there should be places for the understory trees.

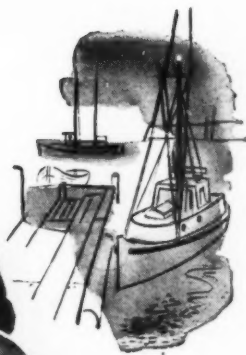
Perhaps I am just writing down a projection of what I should like to do. But it's a suggestion, anyway. I think it would help broaden the interest in the magazine and, what's more important, in trees themselves. —*Chester P. Holway*, Chicago, Illinois.

Attention—Foresters and Wildlifers

SIR: The Denison Society of Stonington, Connecticut, one of those incorporated groups of heirs that one finds in this part of the country, has made available the old manor house and a hundred acres of woods—meadow and swamp—to the Pequotsepos Wildlife Sanctuary, Inc., of which all the forward-looking men of Stonington Township are founders. The house in question is a beautiful early Eighteenth Century job and will be revamped. It will be a local historical museum and the general headquarters of the wildlife sanctuary.

The founders are looking for the right man and his wife to be resident curators of the house and warden of the sanctuary. It has to be a couple and it would help a lot if the man were a forester or had been with the Wildlife Service. I thought you might perhaps know of some veteran and his wife who would be qualified and be interested.

The job would pay around \$150 a month at first—maybe more later on. The couple would live in the house, rent free, and have heat and electricity furnished. The man would have a free hand to plan the improvements and management of the sanctuary and would get an annual working budget from a governing board. —*Coert du Bois*, Stonington, Connecticut.



Washington

THE EVERGREEN PLAYGROUND

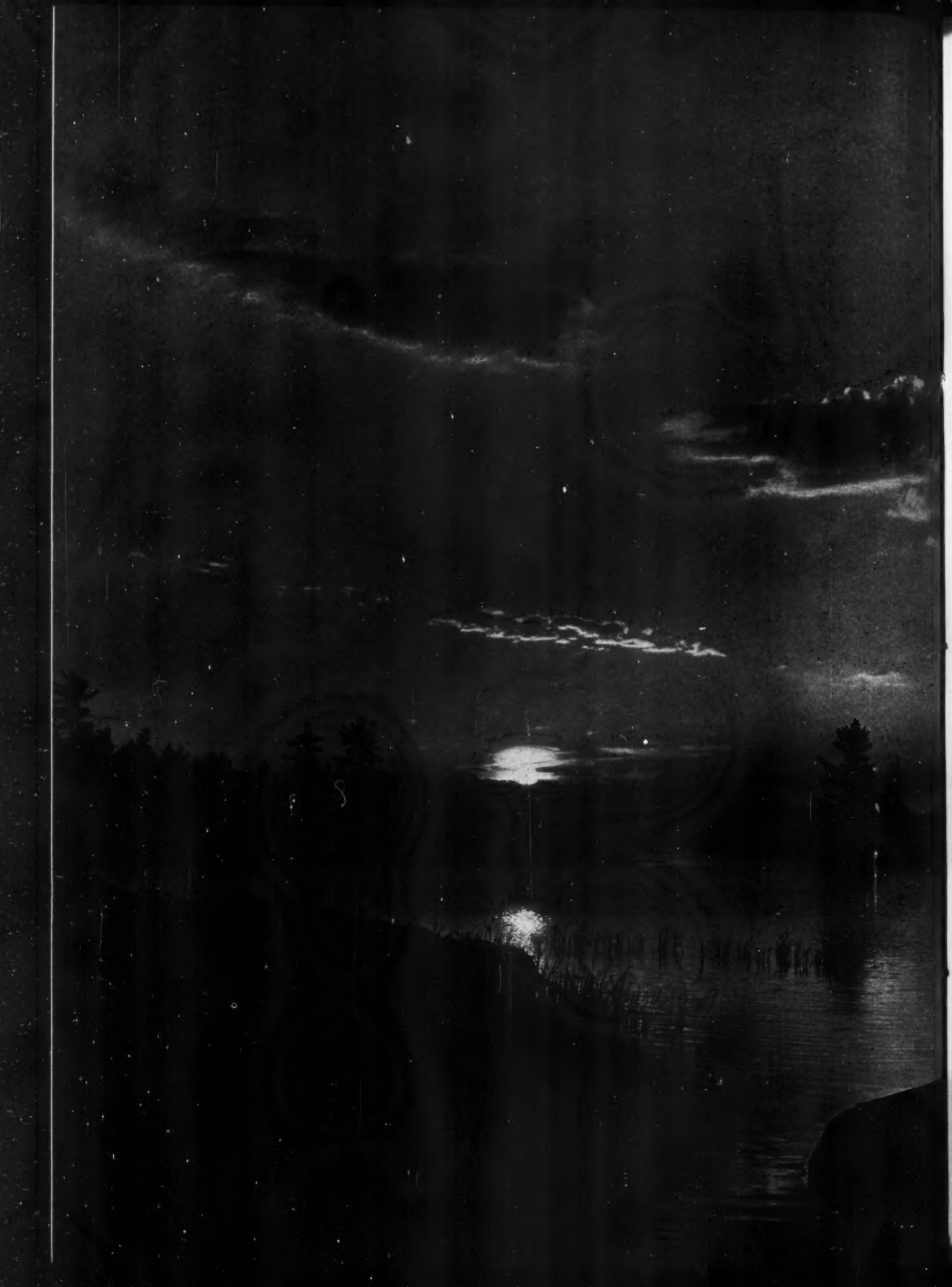
CHOOSE your own tonic in this ever-glorious playground. Visit Grand Coulee Dam and Spokane's Inland Empire of lakes and streams. Explore vital Seattle and Tacoma—gateways to the Orient and Alaska...go ferry cruising on island-dotted Puget Sound...hike over the glaciers and alpine meadows of Mt. Rainier and Mt. Baker...roam the forested Olympic peninsula rising from the Pacific...fish, sail, swim, dance, ski. They're all there, the ingredients of a perfect Victory Vacation. While The Milwaukee Road is still engaged in the job of getting our service men home, it's not too early to plan your long-delayed tour of the Northwest via The Olympian.

F. N. Hicks, Passenger Traffic Manager,
Chicago 6, Illinois

THE Milwaukee ROAD

Electrified over the Rockies to the Sea





Needed Now—Spirit of Conservation

AT NO time in the world's history has conservation in its larger sense faced a greater test. Most of us are wont to think of conservation in terms of a long-range objective of assuring future resources essential to sustain human life, and to provide a more beautiful land for generations to follow us.

World events, however, have brought this long-range objective face to face with today. Tomorrow will be too late. We refer, of course, to the millions of people who are on the brink of starvation in other countries. For them we plead that the spirit which underlies conservation for the future be brought into play to help meet the stark emergency of today.

There are numerous ways in which to put this conservation spirit into action. A number of groups have

been organized through which help can be sent to those who need it. One of the simplest in point of organization and quickest in point of action so far as the individual conservationist is concerned, appears to be the Cooperative for American Remittances to Europe, Incorporated, known for short as CARE.

Through this organization it is possible for any individual or group of individuals in this country to render quick help to starving families and people in famine countries. They may be designated by name if known or the help may be designated for general relief.

CARE has immediately available food, in the form of several million surplus, 10-in-1 packages of Army rations, by virtue of the fact that the War Assets Administration has given

it priority of purchase for relief purposes. Each package is sufficient to sustain a family of four for two weeks. The food is wholesome, nutritious and balanced. The cost of the package and its delivery to designees is \$15. Moreover, the food is delivered promptly, often within two to three days from the time orders are placed.

CARE is a non-profit organization, approved by the President's War Relief Control Board and the Department of State. It is sponsored by 24 major voluntary agencies including churches of all denominations, labor and civic groups. Its address is 50 Broad Street, New York 4, N. Y. Order blanks may be obtained from that address, from member banks of the American Banker's Association, or from The American Forestry Association.

Coming—A New Era in Forest Protection

AS THIS is written, we seem to be well on the way toward a new and promising era in forest fire protection. Paradoxically, hope lies in some of the very weapons that helped burn Germany and Japan into submission—aircraft, bombs and flame throwers. As A. G. Hall brings out in his article "New Weapons for the Fire Front" (see page 256), these and other weapons of modern war are being studied and tested jointly by the U. S. Forest Service, the Society of American Foresters, the American Society of Mechanical Engineers and others. They will not all appear in the timberlands this summer, but practical, realistic fire control men do not bat an eye at the suggestion that a year or two may bring startling, if not fantastic, developments in anti-fire warfare in the woods.

These include aerial water bombs set off at tree-top level by the now famous radio proximity fuse. Or perhaps heat-attracted bombs will be employed. It means cargo and passenger planes speeding men and equipment to where they are needed—helicopters where landing fields are not at hand. Indeed, it is less fantastic than one might imagine to picture helicopters hovering over a forest blaze dropping fire extinguishing

chemicals or dusts. Ground forces—and like the infantry in warfare, they are and will continue to be the backbone of fire control—made more mobile by the use of jeeps and half-tracks, will move into action with flame throwers, fog devices, walkie-talkies and other weapons now being designed or redesigned.

The purpose of these experiments, of course, is to bring about more rapid control of fire and thereby reduce forest destruction to the bare minimum. In essence, it is hoped to achieve for our timberlands a system of fire protection as effective, relatively speaking, as that of a modern city fire department.

Eventually, we believe, this can be attained. Great, devastating fires that lay waste whole countryside may, barring the unusual, become rare events. But not until the prevention phase of protection is elevated to the level of suppression. Not until farmers and forest operators react to slash burning under dangerous conditions as they normally do to the idea of burning trash in the basement of their homes. Not until fishermen and other recreationists realize that flipping a lighted match or cigarette on the forest floor is perhaps more haz-

ardous than dropping it on the living room rug. Not until society considers the forest incendiary as great a menace as the city fire bug.

What is the promise in this direction? In prewar 1940, on forest areas under protection, there were 76,000 known man-caused fires—around 90 percent of the total number on these lands. In 1943, when people under rationing were resource conscious, this figure jumped to 82,000.


Thus while we build up our suppression forces, we witness the sad spectacle of careless, thoughtless and selfish individuals giving us more fires to suppress—the most direct way we know of getting nowhere. Perhaps there is a parallel in present world conditions. The atomic bomb is a mighty antidote to war—but it can achieve little more than terrifying destruction if aggressor peoples persist in waging war. Perhaps we can achieve the hope of the world and outlaw war, but if not, and certainly at the moment there is small reason to be optimistic, it is more than folly to countenance further unnecessary destruction by fire of a resource so vital to national security as our forests. It is time we realized this.

◆ "Summer Comes to the North Country"—Photograph by John Kabel

NEW WEAPONS FOR THE FIRE FRONT

By A. G. HALL

The era of mechanization is dawning over the forest. Here are new developments in fire protection—subsequent issues will reveal progress in modernizing pulpwood and timber harvesting



"A squadron of heavy bombing planes, each dropping 38,000 pounds of water bombs has subdued what promised to be the season's most devastating forest fire."

Flashing these words, the radio announcer goes on, "Ground crews and equipment brought in by helicopter are mopping up the area. All danger of further spread should be past by early morning, according to Forest Supervisor J. B. Smith who has been observing the progress of the fire fighting from his plane over the area. He is here in the studio now. Can you tell us something more, Supervisor?"

"Glad to. Ten years ago it would have taken us almost two days to get men with hand tools packed into this area by horse, and by that time it would have required hundreds of men to bring the fire under control. Today's fire was quickly stopped by the water bombs, set off at tree-top level by radio proximity fuse."

Fantastic? Perhaps. But keep tuned to your radio, because before long you may hear just such a report as this—possibly others that now seem even more fantastic.

While mechanization may never completely remove forest fire fighting from the category of a "hard, dirty job", it promises to bring about more rapid control and thus reduce the area burned. Furthermore, it reduces tremendously the amount of hand labor necessary to get that last spark out.

The recent war brought on developments in all kinds of equipment,

many of which are applicable to forest fire prevention, detection and control. Some, such as improved light tractors, are extensions of prewar developments. None are completely new, but most of them will be starting to the forester as well as the layman.

The more spectacular are the airborne fire control devices, but equally important are incendiary substances for reducing fire danger, new fire line builders and improved transportation machinery.

Since the prevention of fires is of prime importance, let's take a look at what's ahead in this field.

Here the airplane may be called into sounding a warning of fire danger to brush burners and recreationists. A loud-speaker device has been developed which enables a pilot or observer in a plane to boom out messages to groundlings. It was used by the Army for directing ground operations, and the U. S. Forest Service has used the device in giving instructions to smoke jumpers during their training periods.

With the loud-speaker in his plane the forester can cruise over the countryside spotting brush burners and warning them of the degree of fire hazard, and in areas where seasonal brush burning laws are in force, directing them to extinguish their blazes. In crowded recreational areas, along roads and streams and at camp sites emergency warnings can be quickly given when fire danger is acute. Psychologically, this voice from on high should have a spectacular effect.

On the fire itself, the speaker may

be employed to direct ground crews or to warn fire fighters of shifts in fire direction. Unfortunately, the loud-speaker is a one-way communication channel. The ground forces are unable to reply except with signals. Radio has been developed to fill this gap, however.

For reducing fire hazards, the states will have available to them this year a large supply of "goop". This was used by the Army as an incendiary material. Consisting of magnesium metal, petroleum, asphalt and kerosene, it holds fire and an intense heat and is ideal for burning logging slash and damp brush in weather that is perfectly safe for such operations. The Army finished the war with about 50 million pounds of goop on hand. It is now being made available to state forestry departments and private forest agencies which can be depended upon to use it with the necessary precautions—for goop must be handled with care. It may ignite spontaneously if its temperature is raised above 150 degrees. Its ash contains carbide and may generate acetylene when wet.

Appearing very much like dry, hard asphalt, goop is chunked into a wet brush pile and ignited with a torch. It is difficult to ignite with a match, but it can be so lighted if thinned out with kerosene and glycerine. Damp or wet material may be fed into the fire.

By making possible the cleaning up of slash on non-burning days, the use of goop should result in safer hazard reduction. It may also be used for burning off roadsides, and in snag felling. For the latter use, holes are bored into the snags to form a draft,

Future fires may be held in check by aerial water bombs until ground crews arrive

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FISHER

one hole is filled with goop, and the goop is ignited.

Jellied gasoline also has been tried with success. But it is expensive and not so satisfactory as goop. Jellied gasoline is produced by mixing napalm, a granular substance much like corn meal in appearance, with ordinary gasoline. But with gasoline costing from 15 to 20 cents a gallon, it is far too expensive for general use.

The flame thrower, or some adaptation of it may be used for controlled burning where it is desirable to produce a quick scorching flame to reduce litter and low plant life. As employed against the Japs, the flame thrower has not proved satisfactory in peacetime forestry use because of its short burst of flame—only eight seconds—and the intricacies of its controls and fuels. Experimentation with this type device is going on however, and the possibility of a flame-throwing, tractor-operated line builder which builds and burns out

line and lays a heavy water fog to prevent spread along the line's edge is not too remote.

For use in the chaparral of the Southwest, a flame thrower using fuel oil has been developed. It can be carried by two men and may be operated from the back of a mule or jeep. This or similar flame throwers may be used also, as is one developed in the Northwest, for reducing large volumes of logging slash.

To speed up the accumulating of slash in piles preparatory to burning, a slash buncher has been made with specially designed teeth mounted on a bulldozer blade.

For fire detection and reporting, the airplane is staging a comeback. In 1919, the U. S. Forest Service used Army aircraft and pilots for fire detection work in California; and during the season of 1920, 37 planes were operating on regular trips. The fixed point system of detection, employing fire towers, however, proved

to be more accurate and generally more satisfactory. While the airplane lost some of its popularity as an instrument of fire detection, it continued to be used as a supplement to the fire tower system. For example, when visibility from the fire tower drops from its usual 20 miles or so to about three or four miles, as it often does on hazy days, an observation plane becomes a valuable adjunct to the detection system.

Likewise, the plane can follow the course of a storm and spot the "sleepers", or slow-burning snags, which may remain invisible to tower-men until they become serious.

In the early days of aircraft use, the pilot would spot such snags and sketch rough maps of their location. These maps would be weighted and dropped into the nearest fire camp.

Now the pilot uses a base map identical with the one at the camp, and is able by use of the two-way radio to speak intelligently to the men on the ground. But bigger things in this field are ahead, not only for detection work but more especially for scouting on large fires.

Here photography enters the picture. It is possible now for the observer in the plane to make oblique or vertical photographic shots of recognizable areas, develop and place key marks on the picture and drop them to the men on the ground. From the snap of the camera shutter until the completed photograph's landing in camp in a long-streamered tube, takes just 11 minutes. The photographer's dark room is a small box, with a red glass top through which he views his work. His hands enter the box, gloved in black velvet; and the gloves are sewed into the velvet sides of the box.

Even more fantastic is the facsimile scanner—a long look ahead in practical development for forest fire use, but nevertheless well on its way. This enables the aerial observer to reproduce on a map or screen on the ground what he sees from the air.

When prevention fails, and after the fires are detected, the key to successful fire fighting is to get men and equipment there—and fast. Almost every fire is a one-man job if the one man gets there soon enough. In shortening elapsed time between detection and arrival of the first men, the airplane seems to be the best answer.

Because of the absence of landing fields in the western forests, and in some cases the almost impossibility of constructing them, the "smoke jumpers" were developed by the U. S. Forest Service. These forerunners of the wartime paratroopers have proved



With power in all wheels, the jeep goes anywhere with men and tools

The war-proved power saw speeds up snag felling and reduces costs



themselves without a doubt. Their story is well known and their effectiveness in reducing elapsed time in remote areas is well established.

Smoke jumpers, however, require special training—training which cannot be given to large groups in a short time. While the smoke jumper doubtless will remain an important part of the fire control organization in many remote areas, the use of aircraft will make possible the transportation of larger numbers of fire fighters.

The first development in this direction is the strategic placement of emergency landing fields. Properly located, such fields can make possible the delivery of fire fighters within reasonable travel distance of almost any fire.

More landing fields and the use of amphibious planes which can also take advantage of natural lakes as landing areas will reduce elapsed time, the numbers of men needed to control a fire and, of course, the total fire cost and loss.

The airborne troops of World War II delivered everything from small carbines to light tanks under battle conditions. Even before the war, the forest fire fighting agencies were dropping hot meals and light equipment to fire fighters with a minimum of breakage, by using simple homemade parachutes. Probably the first large-scale work of this type was in the Olympic National Forest in Washington, in 1931. As early as 1939, over 10,000 pounds of water and food and supplies were dropped by parachute to fire fighters on the Los Padres National Forest in California. The plane delivered 1500 pounds every two hours; the best a pack mule could do was 300 pounds in six and one-half hours.

The free-fall box, developed by the Forest Products Laboratory (See "House of Wood Magic", February issue), also has possibilities of application to the aerial delivery of food and equipment. In remote areas where landing fields for conventional type cargo and passenger planes are out of the question, the helicopter may prove to be the answer. In fact, the U. S. Forest Service is now carrying on tests with helicopters to determine their adaptability to use in mountain areas.

Limiting factors at present are the unknown quality of the helicopter's performance where treacherous mountain drafts make steady control difficult, and the limitations of its "pay-load" carrying capacity. But the helicopter is new, its development so far has not been made with for-



Hovering like a humming bird, the helicopter can be used for safe delivery of men and equipment or for fire detection and observation

est use especially in mind. When American foresters and engineers get together to solve the problems of delivering men and equipment on ridge tops or even on precipitous slopes, one can be reasonably sure of the ultimate answer.

Exhaustive tests are being made in California by the U. S. Forest Service and the Army's 4th Air Force. Both the R-6 helicopter and a newer model, the R-5, will be used to determine the practicability of transporting men and equipment to fires and the discharge and pick-up of men by use of rope ladders.

The helicopter also may eventually be the plane that hovers over the fire's edge and drops extinguishing substances on the blaze itself. For-

esters recognize that to control a large fire spread out over hundreds or even thousands of acres by dropping water or chemicals would require quantities of the extinguishing substance manifestly impossible to deliver. But—and here is where the foresters base their hopes—with airplane delivery of the fire extinguishers, fewer fires should ever reach proportions that will make deliveries of enormous quantities of water or chemicals necessary.

The job of the aircraft will be to get to the fire while it is still relatively small, drop sufficient extinguishing material to keep it small until the ground men can get there and do the clean-up job.

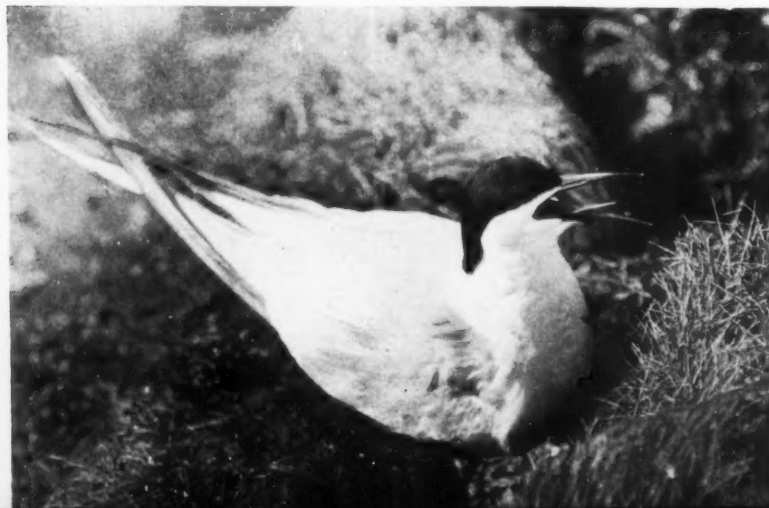
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The loggerhead shrike builds its nest in dense shrubs, bushes, or trees, preferably those with thorns to protect the young



Herons (above) congregate in isolated spots, usually over a marshland, while the tern (below), unprotected from the heat of the sun, raises its family on exposed sand or rock



By CHARLES ELLIOTT

HOMES of birds occur all over the face of the earth, from pole to pole, from snow banks to the Arctic to the coral reefs of tropic seas. Red clay banks, tall marsh reeds, sand beaches that grow out of the ocean swells, mountain crags and parched desert sands—all harbor the embryonic songsters at one time or another. And trees, too, carry their share of this creative burden.

There is no housing shortage in the bird world. Each family solves its nest construction problem with characteristic ideas. Some mothers lay their precious burdens on the hard, barren ground. Some set up such a scanty and careless arrangement of sticks or twigs that no egg could retain its precarious perch without a low center of gravity. Other expectant parents go to elaborate care to make and decorate a well-hidden domicile. The nest must be correct and formal and fit an exact pattern.

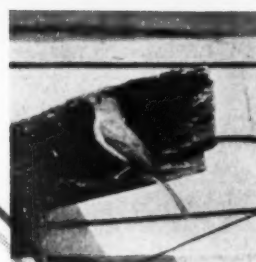
The nest of the phoebe resembles a lump of moss. It is anchored on a crevice or crack and plastered against a granite wall or under the eaves of a man-made building, always sheltered from wind and rain.

The orchard oriole builds its home with green grass, entwining a bunch of green tree leaves together in a careless knot. It is invisible from a few feet. Not until the young have flown do the grass stems and leaves fade to gold and the nest is no longer camouflaged.

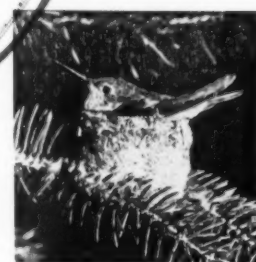
The oven-bird is so named because its house is shaped like a miniature oven. The bird hides it on the forest floor and builds a little tunnel with an inconspicuous entrance. The brown creeper hides its house behind a loose fragment of bark.

The crested flycatcher is a superstitious member of the avian family. Throughout the year it makes more noise than cinema Donald Duck, except at nesting time when it is as furtive and noiseless as a falling leaf. The flycatcher never builds a nest without weaving into it the cast-off skin of a snake.

From the tropics to the temperate zones to the shadows of the poles! The first nest of a golden plover ever seen by man was seven and one-half degrees from the North Pole. It was surrounded by a bank of newly fallen



.. no housing shortage for birds



snow which the parent bird had pushed aside. Nearby, the great northern raven had raised its brood in a blizzard while spring was just a promise. The first nest of the raven ever found in the north Georgia mountains contained eggs in the month of January. Icicles eight feet long had to be chopped away before the eggs were visible.

The tiny Carolina wren is cosmopolitan. Any hole it can squeeze its feathers into is a potential home. Its tiny head packs an amazing amount of ingenuity. One summer Raiford Brown and I pitched our tent at 3,000 feet elevation in the southern Blue Ridge Mountains. Raiford hung his hat on a tent peg while we dug ourselves in for six weeks in a land of blue tops and virgin forests.

While we drove tent pegs, a Carolina wren moved in and took possession of the hat, which hung upside down by its chin strap. When we walked in the tent again, she was making a nest in the hat.

That summer the pair of wrens raised a family just at the head of my bunk. At daylight I would awake and find her watching me out of bright black eyes, while her mate sang from the tip of the ridge pole over the tent. Not until the entire family had been hatched, fed to maturity and taught to fly did Raiford retrieve his hat. But not a single

freckle would he have traded for that experience.

Woodpeckers drill their homes into dead limbs and stubs of trees. The abandoned holes are sometimes used by screech owls, starlings, bluebirds and others which want the security without doing the work. The ivory-billed, our largest American woodpecker, drills his home in a living tree trunk, and sometimes in his search for insect food, strips the bark from other living trees nearby.

The humming bird is a dainty home builder. The little female makes her nest of lichens and spider webs. So neatly is it constructed that to the casual eye, it appears to be just another lichen-covered knot on the limb. But her eggs, the size of a pea, will soon produce tiny hummers to buzz around your flowers, spreading the pollen cells from one to another, growing strong enough to fly to the South American jungles in the fall.

Most feathered Americans have a definite time in which to build and a definite place in which to make their homes. Many return year after year from their journeys across deso-

late expanses of marsh and jungle and ocean to start their summer homes on the same day in the same tree or box or clay bank.

An exception to this rule is the cowbird, which makes no nest at all, but lays her eggs in the nests of other birds. Another bird family raises her orphan child. Nature, strangely enough, aids and abets this callous conduct. The incubation period of the cowbird loafer is so timed that the orphan egg hatches out several days before the other eggs in the nest. The young cowbird is large and strong when the other babies make their appearance. He dominates the smaller birds, snatches most of the food brought to the fold and in general is the bully of the brood. Only the little red gods know why the parent birds to whom the nest belongs, tolerate him instead of tossing him out on his bully back.

The American crossbill is another bird which seems to have no definite route of migration or a definite time of the year for rearing a family. Instead, this gypsy of the bird world follows the seed crops, raising young crossbills at any time of the year

Some birds build new homes every year, others crowd in tenements or move in uninvited with their neighbors. It is a well-established, time-proved housing program



Breakfast in bed for nestling robins is a nice juicy grub. The mud-strengthened nest is secure in a crotch of a tree

and in any locality where a bumper crop of conifer seeds are found.

Eggs are delicious morsels and any nest might fall prey to a marauding jay, a crow, snake and any animal from a mouse to a bear.

But not all birds face the dangers of parenthood alone. Some of the skyway tenants live in birdland towns or cities. The herons, comorants and ibises band together at breeding time and locate in an isolated spot, usually over marshland. Sometimes these rookeries, as they are called, cover many acres, and sometimes one tree contains a half dozen nests, constructed of loosely woven sticks. When flushed, the town inhabitants fly aloft in a great, crying circle. How each bird recognizes and returns to its individual nest is a miracle.

Many shore birds also breed in

colonies. Terns, skimmers, willets and others flock together, usually on a lonely island where they are protected from domestic cats, dogs and other prowlers which relish a delectable meal of eggs and young. The fragile life nuggets are placed in small depressions in the sand. Sometimes the nests are so close together that human feet cannot step among them without crushing eggs or babies. Keeping the rookery nests segregated is simple compared to finding eggs and young in a seaside aerie where every grain of sand, every splotched egg and downy nestling looks alike. But then the Creator has endowed all mothers with strange and understanding talents.

Murres, dovekeys, and auks all make their homes in colonies far to the north. They choose an inacces-

sible cliff and lay their eggs on rocky ledges and narrow plateaus high above the gray spray and foam of crashing seas, where the tenements are safe from the prowlers of the wild.

The males of the bird clan are, almost without exception, the brightly colored members of the family. Since the female must lay and incubate her eggs, her dull coloration prevents her from being conspicuous. But in birds, as in human families, there is no prescribed ruler of the household. Sometimes the father rules the roost, sometimes it's the mother bird. Many times they share alike in their domestic duties and activities.

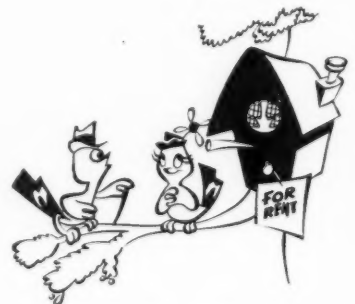
The least sandpiper is an example of the extreme. He flies north to the Arctic Circle to produce his brood. His nest is a shallow depression in the ground or on some moss-covered rock. At times, when they are available, he rakes in a few leaves. His mate lays the eggs. There her task ends. She leaves to him the problems of both fatherhood and motherhood, of hatching and feeding and raising the family. She flies away to the warm days and nights of the southland.

Tom Burleigh, ornithologist of the U. S. Fish and Wildlife Service, tells me that invariably he sees the female of the least sandpiper in North Carolina during the first week or two of July. Her plumage is full and beautiful. Not until the middle of August do the males appear with their broods of young. The old man's coat is ragged and worn, the mark of a worried and hard-working parent.

In direct contrast to the least sandpiper, is the European red-breasted nuthatch, which seals his mate in her nest and feeds her through a tiny slit until the eggs are hatched.

Many birds share with each other the duties of homemaking and care of their offspring. Usually these birds, male and female alike, are dressed in dull clothes, to hide them

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WHERE MONUMENTS ARE LIVING TREES

By MARGARET WALLACE CHIPLEY

IN walking through a cemetery have you ever noticed the difference in the monuments placed there in memory of loved ones who have been called Home? Some, recently placed, are beautiful in their marble whiteness and chiselled columns; others have lost much of their beauty with age; and some after many years have crumbled and fallen away. There is no sustaining life in those stones.

This is the story of a memorial grove where there are no graves and the monuments are living trees.

The grove is located at Monument, Colorado, and is a part of the Monument Nursery maintained by the U. S. Forest Service. Here are grown trees to be planted on devastated areas within the national forests, or for shelterbelts and windbreaks on farms in the various states.

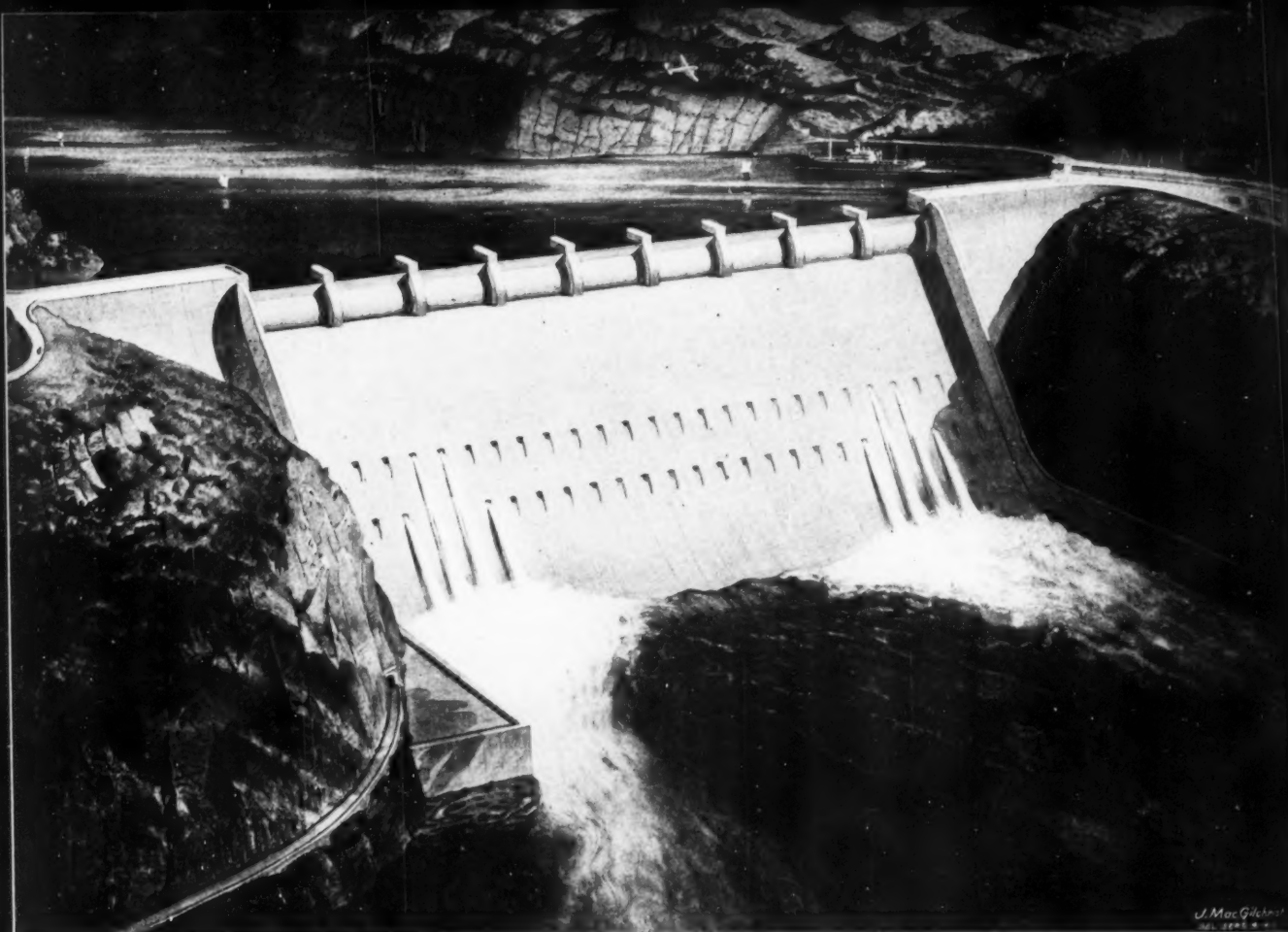
In the spring of 1921, a small group of men and women gathered at the nursery and with appropriate ceremony set aside a plot of ground for the planting of trees in memory of those employees of the Forest Service of the Rocky Mountain region who had passed on.

At the time of that meeting, 30 trees were planted in memory of those who had died previous to that date. Five of these were in honor of forest officers who lost their lives in World War I. Since that date, as deaths have occurred, other trees have been planted and now there are 60 beautiful Colorado spruce trees in the grove, each appropriately marked.

Here are monuments of living trees—to men and women who dedicated their lives to trees.



The grove of Colorado spruce at the Monument Nursery, Colorado — each tree a memorial to members of the U. S. Forest Service of the Rocky Mountain Region who have passed on



Artist's conception of the giant Yangtze Gorge Dam, largest of its type, which will dwarf the pyramids

A Dam for the Yangtze

By VAN BEUREN W. DE VRIES

THE Yangtze, China's greatest river is to be put to work! Aided by engineers of the U. S. Bureau of Reclamation, the government of China is planning development of the largest irrigation and hydroelectric power project the world has even known, key feature of which will be a huge dam in the gorge of the river about 300 miles east of Chungking.

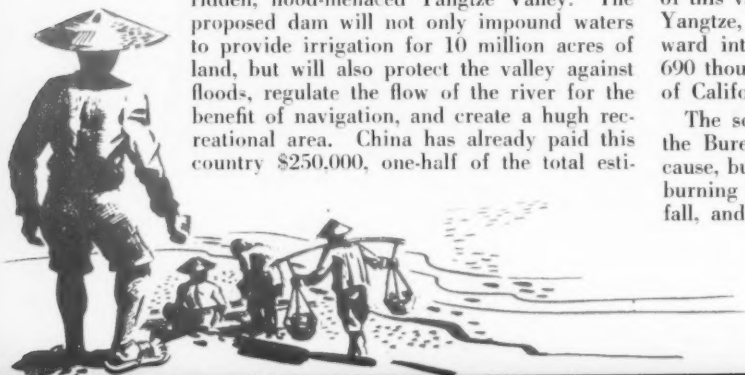
This enterprise, cost of which will total more than a billion dollars, aims at revitalizing the jam-packed, hunger-ridden, flood-menaced Yangtze Valley. The proposed dam will not only impound waters to provide irrigation for 10 million acres of land, but will also protect the valley against floods, regulate the flow of the river for the benefit of navigation, and create a huge recreational area. China has already paid this country \$250,000, one-half of the total esti-

mated payment, to cover initial costs of services to be rendered by the Bureau of Reclamation.

Hinging on the construction of the dam is a comprehensive plan to rebuild the valley from the rice roots up. China has long recognized the need of freeing millions of people from the famines and floods which have ravaged the valley for centuries—floods caused by erosion, heavy silt deposits, and summer monsoons. Some idea of the size of this valley may be gathered when it is realized that the Yangtze, rising in the mountains of China and flowing eastward into the China Sea, has a drainage basin covering 690 thousand square miles—more than four times the area of California!

The soil erosion problem is recognized by engineers of the Bureau of Reclamation as not being due to any one cause, but rather to a combination, such as overgrazing, the burning off of forest and vegetation cover, excessive rainfall, and climatic conditions.

AMERICAN FORESTS



In the opinion of Dr. W. C. Lowdermilk of the U. S. Soil Conservation Service, noted soil explorer, China's accelerated erosion is caused by a combination of excessive clearing and cultivation.

"Just the mere cutting of the forest does no appreciable damage to the soil", he declared, "as the timber stand grows again, but cultivation of mountainous land up the slopes has been the main cause of accelerated erosion and flash flood flows charged with erosional debris".

Dr. Lowdermilk, who has spent many years in the interior of China, pointed out that when land is cleared of its natural cover the interdependence of soil and vegetation is destroyed, and the soil loses its protection from surface wash.

According to W. E. Corfitzen, associate engineer, Bureau of Reclamation, this problem must be attacked on many fronts, including that of the watershed itself.

"The major problem of silt deposit must be controlled at the source—in the hills of the catchment area," he said. "From an engineering standpoint check-dams can be built on tributaries to retard the velocity of flow in the tributaries themselves and a large part of the silt can, in this manner, be kept there. But the soil must be kept in place in the ground first, and the only way to solve this problem is through reforestation of the area, soil conservation measures, and the planting of soil to erosion-resistant crops such as alfalfa."

As for the dam itself, it will tower above that at Boulder Canyon on the Colorado River, now the world's highest. The Yangtze gorge dam will be 750 feet high compared with 726 feet of Boulder Dam. Its hulking mass—a third greater than Grand Coulee dam on the Columbia River—will dwarf the largest pyramid. A reservoir backed up for 250 miles behind the dam will store water for irrigation, navigation and power.

The reservoir, by the way, will have a capacity of 50 million acre-feet, enough water to cover the entire state of

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Slopes, cleared of trees and cultivated, supply erosional debris for floods in the Szechwan area

理想中揚子江的水閘



Abandoned bench fields and new cultivation high on mountain slopes in the Yangtze drainage



By JOHN L. BLACKFORD

SOMEDAY south of Panguitch in southern Utah, now that miles are again unrated, you will expectantly leave U. S. Highway 89 to discover the promised marvels of Bryce Canyon. The uninitiated, driving up a bravely painted gorge, often mistake Red Canyon for the greater wonder beyond. Actually the magic panorama is not unfolded until you step to the precipitous rim of the lofty Paunsagunt Plateau.

Held there by the spell of fantastic erosion forms, you are enthralled by the brilliant tints of pinnacle, terrace and spire. If a natural wonder could ever blind one to the beauty and magnificence of its companion trees, it would happen here. But the sight-seer is conscious of trees everywhere.

They grace the canyon's depths and crown its colorful rim. Their variant shades of deep and silvery green provide a natural complement for the bright pinks and creams, the flaming orange and reds of this fanciful wonderland. Added to this, oddly twisted and weathered veterans match the grotesqueness of the indescribable stone figures.

Yet Bryce conceals even more fabulous colors. There are tree-bordered vistas still more subtly beautiful. Only when you become a wanderer or rider upon its trails will you experience in full measure the canyon's incomparable allure.

In reality, the "canyon" is a vast, semi-circular amphitheater, stream-carved and rain-washed from sands

and marly limestones of the eastern edge of the Paunsagunt. Its delicate and vivid tints are gifts of mineral-bearing drainage waters flowing for ages from the plateau's upper washes. Those waters have made it the most celebrated exposure of the famous Wasatch or Pink Cliffs formation, its strata among the most highly colored of any that form the earth's crust. Add to this the forest growth of a southwestern upland, and Bryce's charms are almost without rival.

Seen from the rim, individual trees are diminished by the sweep of distances, but alongside the trails white fir, Colorado spruce, bristlecone and limber pine, Rocky Mountain juniper and Douglasfir come into their own. Similarly, along the long scenic drive to Rainbow Point and the southern reaches of this national park, it is the woodlands of the plateau that attract the visitor's gaze, broken only when the roadway swings in to the towering brink of the great Pink Cliffs.

When you visit this wonderland of tinted pinnacles, terraces and spires, you will find added beauty in the trees, many of them twisted and weathered, that grace the canyon's depths and crown its colorful rim

From park headquarters, dominated by ponderosa pine, the motor trail mounts with easy grade. Soon sylph-like, silver-boled aspen gather in graceful groves along the way, while white fir and spruce march in ever more crowded ranks till the point is attained at an altitude above 9,000 feet.

From Rainbow's Crest, well up in the Canadian Life Zone, you survey the vast, irregular semi-circle of startlingly stained precipices, look down over reaches of ponderosa pine, past bordering juniper and pinyon, toward the Paria River and the little village of Tropic. Westward may be seen the valley of the Sevier, given over to Lower Sonoran vegetation with climatic conditions similar to those of desert Mexico.

But leave the rim back at Sunrise Point, take the trail to Peek-a-boo Canyon, and before losing yourself among rock marvels of the Queen's Garden, you are sure to note the bizarre examples of bristlecone, a relative of foxtail pine, growing upon polychromed slopes of disintegrating limestone. Soil conditions and exposure to weather extremes appear to make the site prohibitive to plant life. Yet thin rocky mantle, rapid evaporation, and prolonged dryness only invite this tree to tackle its job of binding the soil at high altitudes. Numerous dead trunks throughout the scattered stand, tortuous forms, and meager, scraggly growth all testify to the bitterness of the struggle. It is notable that practically no ground cover can secure a foothold where these trees have survived.

Down among the bewildering and intricate mazes of stone steeples and minarets grow ponderosa pines, contributing the needed touch of verdure to a storybook setting. Occurring here between 6,500 and 8,500 feet, ponderosa is the common tree of plateau and canyon. One morning on the Peek-a-boo trail—a name derived from its Alice-in-Wonderland-like surroundings—I paused to admire a wierdly twisted trunk whose statuesque pose was wholly in character with its grotesque environs. Swinging into its branches came a family of pygmy nuthatches, their elfin piping bringing dulcet notes to the rock-spined ravine. Long-crested jays, clad in scintillant blue and black, resort to these sunny stands, and the chestnut-backed bluebird flashes down their high, redolent aisles.

In the cool narrow canyons that separate the countless rows of fantastic pinnacles, Colorado spruce

lends added enchantment. The new growth of this most beautiful of evergreens frosts the tree with a silvery blue.

The path winds on, revealing vistas that test the imagination. Pale yellow and coral, burnt orange, deep rust and immaculate white, color, stain, or band horizontal strata that run through wall, tower, arch and monument. "Windows" in the rock pierce tessellated ridges.

On the way limber pine picturesquely mounts hill and promontory, or takes its stand against sunlit wall and escarpment. Sending out its wide, flexuous, lateral boughs for the light, tossing whiskbroom tufted

branches in the constant breeze, it delights in the loose, limy, well-drained soil just as it does in the ash of volcanic regions. Here, as ever, it scatters its number, for limber pine prefers the wider spaces and never crowds its associates. Stunted trees capture and hold exposed slopes and ridges with little competition from any but bristlecone.

At last in the tiring heat, refreshed by occasional rest in the deep shadow of a vertical wall, you come to the little oasis of Peek-a-boo Canyon. Great white fir and spruce gather closely now, the intermittent splash of water from a rusty pipe is sweet

White fir is one of the most beautiful trees in the park. Tall, with heavy foliage, it is seen at its best along the Peek-a-boo Trail



music to the ear, and even the clear little pool in the tank near the end of the hitching rack is welcomed as we sit down beside it. The grove is one of those restful spots, where days might drift by without consciousness of their passing.

It is white fir that for the most part shelters the oasis. A tall tree of heavy foliage, loving all the higher portions of the park, it throws deep shade and gives the eyes relief from trying glare. A massive tree where rich, moderately moist loam may encourage a stature of even 200 feet, it nevertheless grows well here in coarse rocky soil within the shelter of Bryce's walls, for it demands less air and soil moisture than other true firs. With spruces it verdures the small side gorges at Peek-a-boo,

luring you to explore each hidden corridor.

Not far beyond this deep grove the path divides. A turn to the left and you circle out upon the floor of the great rock bowl, returning by way of the Navajo or the Comanche Trail. Following along the way, Douglasfir prefers the cooler, more moist, shaded locations. At the end of "Wall Street's" deep rocky crevasse, a single tall specimen rears its lofty column upward, towering amid turrets of brilliant stone. A path to the right ascends spectacular cliffs past the great stone "Organ" and "Cathedral" to emerge at Bryce Point.

On your return from Sunset Point near the lodge area follow the Loop Trail north to Fairyland. Its winding grades bring you back at length

through Campbell Canyon. The trail skirts the rim, crosses the slope linking Boat Mountain to the plateau, and drops down into the scenic depths of the Pink Cliffs not far from the northern limits of the park.

Before long you enter the region claimed by Utah white oak. In the lowest canyons this dwarfed, shrubby acorn-bearer may develop into a small tree; on the plateau top it forms dense thickets, mingling at times with curleaf mountainmahogany.

Occasionally across the Great Basin country mahogany attains a height of 40 feet. On these slopes it assumes tree form and reaches its greatest size and abundance in the park. Its name is descriptive of the dark-colored heartwood, which, fine-grained and heavy, will not float on water.

As you proceed, double-leaf pinyon pines cling to the rim, and descend into the castellated canyon called Fairyland. Stubby cones bear edible seeds, the famed "pine nuts" of Southwest Indian tribes, while low-spreading crown and short trunk are familiar features of the far-flung "pygmy forest" of the arid foothills.

Interesting companion to both pinyon and ponderosa is Rocky Mountain juniper. Its picturesque manner of growth produces specimens beautiful for color and symmetry or notable for character and strange outlandishness.

Sturdy Utah juniper, known locally as "whitecedar", wears a ragged and shreddy bark-mantle. Once its fibrous covering yielded cloth, coarsely woven mats, and sandals to prehistoric pueblo and cliff dwellers; today the bitter "berries" still supply food to Navajo and Piute. Within its range this desert juniper assumes the leading role in lower pinyon-juniper forests of the Great Basin.

As you climb the tree-capped rim of Bryce the last time, pausing for a final survey of fantastic temples, courts and towers, so many impressions mingle as to defy expression. White fir's silvery branches beckon to deep shade; bristlecone pines cling like twisted dwarfs to painted slopes; Colorado spruce swirls tinsel boughs. You'd rather not admit that you may never return. Someday you'll be back, perhaps to explore the great bowl by moonlight. Then, though that amphitheater of color still lies dazzlingly before you, you are glad it did not claim you wholly, that other wonders failed to blind you to the unique tree beauty of Bryce Canyon.

In Bryce, the Douglasfir likes the cooler locations. Unusual specimens may be found at the end of "Wall Street's" rocky crevasse





Bristlecone pine grows upon polychromed slopes of disintegrating limestone in the "Queen's Garden"

JUNE, 1946

TEXAS TIMBERLANDS AND



This article previews the findings in Texas of the Forest Resource Appraisal of The American Forestry Association. Other states will be similarly presented in coming issues.

State forestry is 31 years old in Texas, a going concern recognized nationally as outstanding and in certain important respects unique. That Texans themselves are interested in and proud of their state Forest Service is noteworthy by reason of the fact that commercial forests actually occur only in one small corner of that vast domain.

Two factors appear to have favored the progress of forestry in such an environment. Even though mention of the Lone Star State usually brings to mind farspreading cattle ranches and only slightly smaller mechanized farms, the fact is that more than 63 million acres of land bear some kind of tree growth. These wooded regions, most of them definitely problem areas, are scattered from the Sabine and Red rivers of the east and north to the Hueco and Guadalupe mountains of the far west. Thus, many people are acquainted with forests—of a sort—and have become increasingly curious regarding their economic possibilities.

The scaler knows how many and how good are the logs now coming out of the Texas bottomlands



STATE FORESTRY

By JOHN B. WOODS

When the legislature, in 1915, created a state department of forestry, it placed the new agency under jurisdiction of the board of directors of the Agricultural and Mechanical College, an arrangement that has been productive of good results. The state college is highly regarded throughout Texas, and its forestry division, after a few years of foundation work, has enjoyed the confidence of successive legislatures. Since 1922, the new activity has been supported with considerable state appropriations.

The principal forest regions number five or six or eight, according to one's regard for various indefinitely bounded, silviculturally unpromising stands of non-commercial trees. Probably the best classification has been presented by W. E. White, director of the Texas Forest Service, as recently as January, 1946, in a lecture to state college students.

First, and most important upon his list, is the east Texas commercial pine and hardwood region of 11,050,000 acres, lying beside Louisiana. Next to it, and along its western edge, is a belt of open growing hardwood, chiefly post oak (*Quercus stellata*), aggregating 4,401,000 acres. Actually, there is some overlapping of these forest types; 755,000 acres of post oak forest lie within the pine-hardwood region, and 85,000 acres of pine islands dot the non-commercial post oak belt. Excellent tree growth characterizes the eastern forest region.

Although the main post oak area contains small quantities of pine and hardwood sawtimber, most of the growth there is small and scrubby. This wood is estimated at 32,691,000 cords of oak, 477,300 cords of pine and 180,400 cords of cedar. In general such material is used for fuel, fence posts and bridge decking. On the average acre, 93 percent, or seven and one-half cords is scrub hardwood, four percent is commercial hardwood, and the remainder is pine and cedar.

Still further west, in 25 counties strung in a curve from Waco to Austin to San Antonio and beyond, are the cedar brakes, six million acres chiefly occupied by mountain cedar (*Juniperus mexicana* and *J. pinchoti*), but with some sumac



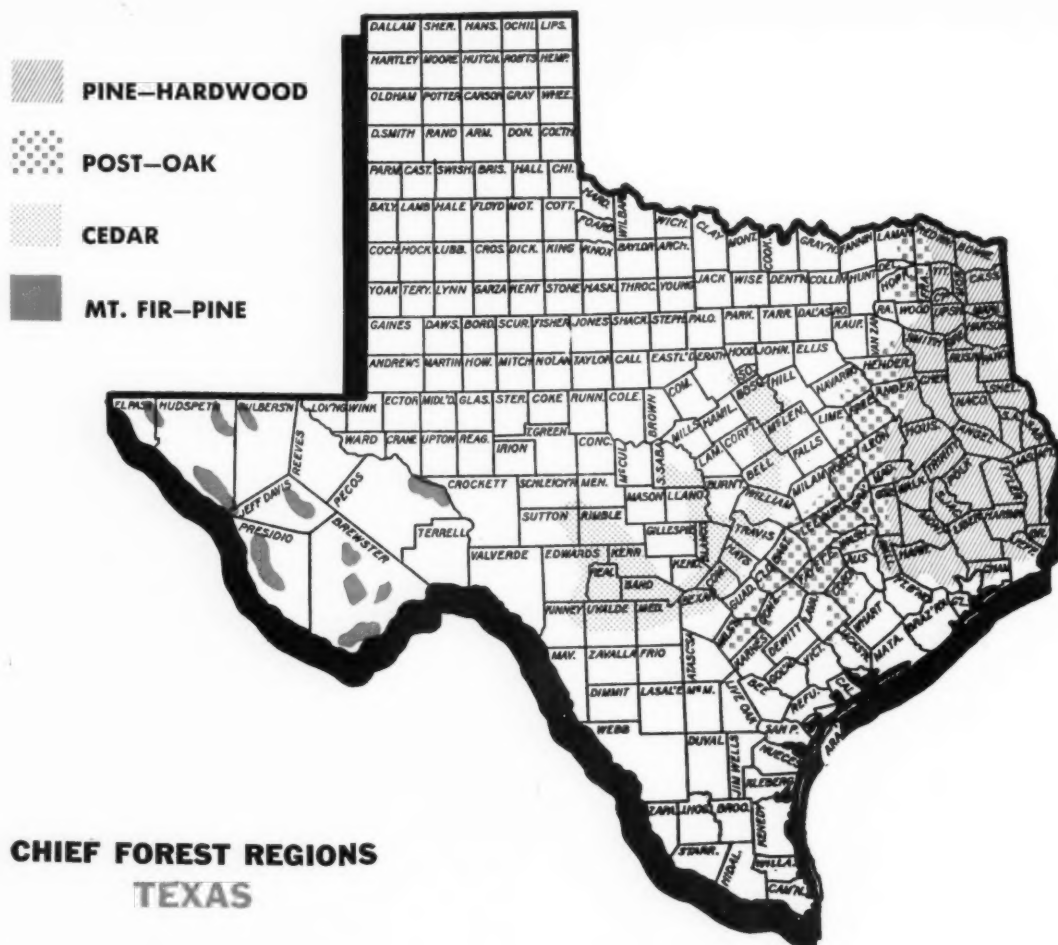
The East Texas pine-hardwood region of 11 million acres is the most productive in the Lone Star State

This is a sample of the mesquite area of central Texas



The post oak area is a belt of open growing hardwood





and red oak intermixed. These somewhat bedraggled stands have long been under exploitation to produce fence posts in great quantities and some telephone poles, together with fuel and cedar-oil.

When early travelers moved westward from the older settlements along the Red River, they passed through three strips of post oak, alternating with mesquite and open plains areas. The two westernmost of these bands of woodland they called East and West Cross Timbers. Probably the tree-covered area exceeded five million acres when settlement began. Today this tree growth of little commercial value is rapidly disappearing to permit cultivation.

Upon the far western mountains are scattered patches of forest which remind the visitor of New Mexico and Arizona. Principal tree species are Douglasfir and ponderosa pine, but there are such other interesting names as Texas madrona, Spanish walnut, Arizona cypress, pinyon and alligator bark juniper. These remote forests, surrounded by desert, are valuable chiefly as game refuges and sources of limited water supplies.

Biggest of all tree-bearing regions, variously estimated to comprise between 40 and 50 million acres, is the mesquite area of central Texas. From the Rio Grande to the Red River, intermingled with and surrounding other forest types,

there is mesquite—here a patch of scrubby bushes, there a group of thick, branching trees. The wood resembles mahogany, takes a fine polish, contains seven or eight percent tannin, but is practically unmerchantable because the usable pieces are too short to be economically logged.

Like the scrubby post oak areas, the mesquite-bearing lands are rapidly coming into farming and ranching use. Heavy machines have been devised for removing such vegetation and the chief remaining interest in mesquite centers about the possibility of putting to value-producing use the great piles of trunks and branches mechanically scraped together and now being disposed of by burning.

It is interesting to note that Texas land use, past and present, bears close relationship to average yearly rainfall. Along the eastern side, from Galveston to the Red River, yearly precipitation averages close to 50 inches. The east Texas commercial forest region enjoys from 40 to 50 inches; sufficient moisture for rapid tree growth and for diversified farming.

The post oak region, with 30 to 40 inches, produces mediocre timber, but can support row-crop agriculture. The cedar brakes and Cross Timbers, with 25 to 30 inches, and the mesquite areas, with somewhat less, offer opportunity for growing cereals, pasturage and, in certain favored spots,

more intensive farming. Beyond are the range lands and, finally, the desert, tapering down to five inches precipitation in a year. While these scantily watered regions challenge foresters to help work out their land use problems, the more attractive opportunities for growing commercial timber obviously are to be found in the eastern counties.

In 1936, the U. S. Forest Service (Southern Forest Survey) completed an inventory of the forest resources of east Texas. They found upon 10,806,000 acres a total sawtimber stand of 28,502,000,000 board feet, of which 10,096,000,000 board feet were hardwoods, and the balance softwoods, chiefly pine. In trees under sawtimber size (less than nine inches d.b.h. in softwoods and 13 inches in hardwoods) there was estimated to be 55,173,000 cords (including tops in softwoods only), 60 percent being hardwoods. Overall wood estimate was 119,660,000 cords. Of this forest area, 7,160,000 acres bore at least 600 board feet an acre of sawlog size trees, although upon four-fifths of this acreage the trees were predominantly second growth. Cordwood stands occupied 1,479,000 acres, while 1,423,000 acres were at least 40 percent stocked with trees of smaller than cordwood size, and 744,000 acres with little or no young growth established.

Periodically thereafter, the experts of the Southern Forest Survey staff kept the inventory current by adding estimated volume of growth and deducting estimated drains of harvesting and mortality. As of the end of 1944, this computed inventory balance stood at 29,306,700,000 board feet of sawtimber, of which 18,733,700,000 board feet were believed to be pine, and the remainder hardwood. Their overall cordwood estimate was 133,881,700 cords, of which 75,276,600 cords were pine. These figures were released in July, 1945, and were later published by the Texas Forest Service.

Late in 1945, the U. S. Forest Service rechecked a number of the areas previously sampled in the original survey, to ascertain whether the present stands actually on the ground contain less or more timber than is indicated by computed inventories, and how much. In this field check, The American Forestry Association participated. While final results are not yet released, it appears that the computations were slightly over-optimistic, but the differences really are too slight to affect seriously any discussion of Texas forest resource facts.

On the other hand, it appears likely from interpretation of aerial photos by the state's own experts, that forest areas in the commercial timber region actually amount to 11,050,590 acres, or 245,000 acres more than in 1936, which may offset the correction of per-acre volumes suggested by the field checking. So, for purposes of this discussion, the volumes presented above may be considered substantially to represent the forest resources of east Texas as of today.

Ownership maps show a bewildering mixture of rectangular survey lines and the boundaries of Spanish land grants. This is particularly true in east Texas, where the "leagues" fronted upon the rivers, and ran back 5,000 "varas", or one league deep. They are still designated in deeds and upon tax books by the names of the original grantees. When Texas became a state, the ungranted land was surveyed and subdivided according to standard federal practice, so today a man's property may contain parts both of leagues and of sections.

Woodlands occupy three acres out of five in east Texas, and the woods are mostly in private ownership. The state has 14,000 acres, other local civil units own possibly 2,000 acres, while Uncle Sam possesses approximately 722,800 acres, nearly all in four national forests. Farmers, 50,000 strong, own 24 percent of all woodlands, and others, chiefly industrial concerns, have 65 percent.

Industrially owned forest lands are steadily being brought

under systematic management for wood production; the state industrial forestry division reports that improved forest practices are now being applied to more than two million acres. However, not over one farmer in ten gives conscious care to his woodlot. Yet the farm woodland area is expanding year by year, through tillage land abandonment. Cattle are increasing as cultivated areas diminish, thus adding to the protection load. Obviously, there is much to be done among these people.

It is recorded that for some seven years after the establishment of a state forestry department, general educational work was stressed, the best possible inventory of forest resources was made, and attention was directed to the commercial importance of timber stands and the lumber plants which they supported. From the first it was claimed that the growing of timber on suitable land deserved to rank in public esteem along with the production of cotton. Such a bold heresy was startling yet, in time, it began to gain adherents.

Due largely to this continued educational program, the legislature eventually took cognizance of forestry and, in 1922, doubled the appropriation for state activities and provided small state forests for research and demonstration. It is significant that even though activities increase and broaden in number and scope, public information or education continues to serve as the spark plug for each of these enterprises.

There is example for all state foresters in the Texas pub-

(Turn to page 278)

Every year, many people visit the protection headquarters of the Texas Forest Service near Lufkin



This newsprint mill in East Texas is surrounded by its growing raw material — forests of pine



Forests

OF THE

BUCKEYE

STATE

By ROY C. BRUNDAGE



This story presents material gathered by the Ohio Forest Survey carried on since 1939 under the direction of O. D. Diller of Ohio Agricultural Experiment Station, with cooperation of the Central States Forest Experiment Station of the U. S. Forest Service and, since 1944, with assistance of the Forest Resource Appraisal of The American Forestry Association.

OHIO is known as the gateway to the Northwest Territory. When the early pioneers en route to the Northwest travelled through the virgin forests of this state, they reported many stands so dense that shade during mid-day was like autumn twilight. Early accounts also claim that the "forest people", those who moved in the van of the settlers or land clearers, spent so much time in the dense shade of the forests that when the leaves fell in the autumn, it took them some time to become accustomed to the greater intensity of the light.

Whether this was fancy or a vivid portrayal of conditions as the pioneers found them, enough facts have been recorded, and a few tracts of old growth timber remain to verify the existence then of magnificent hardwood stands of beech, hard maple, oak, hickory, elm, ash and black walnut that ranged in volume from 10,000 to 30,000 board feet an acre.

Originally, there were about 25 million acres of forest in the state, or nearly 95 percent of its total area. Since much of this area was level and the rich deep soil suited for agriculture, and since navigable water bounded almost three sides of the state, it was inevitable that Ohio should become a leading agricultural and industrial commonwealth. At the present time, the forested area, as estimated by the Ohio Forest Survey, is about 3,708,000 acres of native woodlands and 90,000 acres of plantations—or about 15 percent of the total land area.

In developing land for agriculture, particularly in the

hilly sections of the east central and southern parts of the state, it was inevitable that much land unsuited for cultivation or pasture was cleared of tree growth. In these parts of the state which encompass more than 60 percent of the present total forest land area, heavy cuttings were the rule in the past for charcoal production, mine props and cross-ties. This type of cutting, together with the prevalent practice of grazing woodlands, common in all the central hardwood region, resulted in the high proportion of timber stands that failed to meet the classification of productive sawtimber areas, which are described later on. As shown on the map on opposite page, the remainder of Ohio's woodland is divided between the corn belt area of the western half of the state and the dairy section of the east central and northeast portion. About 595 thousand acres of woodland are found in the corn belt and 852 thousand acres in the dairy section.

Land economists of the state now estimate that about 1,500,000 acres of open land basically unsuited for pasture or crops should be reforested. To restore this land to forest cover will require time, so it is only to the native woodlands that one can look for supplies in the postwar period. Volume found on the 3,707,958 acres is estimated at 9,357,958,000 board feet (International Rule, 1/4 inch kerf).

In classifying present forest stands, the Ohio Forest Survey established four groupings: productive sawtimber stands, pole stands, open park woods and seedling and sapling stands.

Productive sawtimber stands include woods that are fairly well stocked with trees from small poles up to sawtimber-size—i.e. 12 to 30 inches in diameter. Pole stands are those in which most of the trees are under 11 inches in diameter at breast height. Open park stands are composed principally of trees of sawtimber size with so few to the acre that sod has become established. Grazing has eliminated most of the trees in the smaller diameter classes.

Under this classification, the condition of Ohio woodlands is as follows:

Table I—Condition of Native Woodlands of Ohio

Size Class	Acreage	Percent
Productive Sawtimber	986,640	26.6
Poles	2,220,799	59.9
Open Park	273,978	7.4
Seedlings and Saplings	226,541	6.1
Total	3,707,958	100.0

It is readily apparent that, based on this classification, more than half the timber stands in Ohio are pole stands, and that only about 25 percent meet the requirement of productive sawtimber stands in which there is a fair to good distribution of trees of all age and size classes. Such stands, of course, can be more easily converted to full productive units from which timber harvests can be made at relatively short intervals. The poles and other stands will require longer periods to build up the proportion of trees of sawtimber size needed by the industries of the state.

Four major timber types are found in Ohio. These are beech-maple, mixed oak, oak-hickory and swamp or bottomland forests. The beech-maple type covers 44 percent of the woodland area and is found principally in a broad band running diagonally across the state from the northeast to the southwest. This type is also found in the extreme northwestern corner of the state. The prevalence of sugar maple in this type accounts in part for the fact that Ohio is one of the country's principal maple syrup producing states. In 1937, it ranked third in the production of this commodity, the sale of which added some \$800,000 to the farm income.

Mixed oak is the second principal type and covers an area only seven percent less than that of beech-maple. Together, these two types account for more than 80 percent of the

timber stands. The mixed oak type occurs extensively in the hilly areas of the east central and southern counties.

If one assumes that three-fourths of the open park stands are merchantable tracts (tracts containing trees 10 inches or larger in diameter at breast height and having at least 1000 board feet an acre), then about 86 percent of the area containing merchantable timber is in these two types.

Table II—Distribution of Woodland Acreage by Forest Type Areas

Type Area	Poles	Productive Sawtimber	Open Park	Saplings Seedlings	Total
Beech-Maple	899,457	530,357	175,266	23,781	1,628,861
Mixed Oak	877,808	263,179	20,265	198,847	1,360,099
Oak-Hickory	345,613	124,820	47,080	414	517,927
Swamp Forest	97,921	68,284	31,367	3,499	201,071
Total	2,220,799	986,640	273,978	226,541	3,707,958

Although the swamp forest type of the northwestern part of the state is less extensive in area than the other types, it contains some excellent commercial timber such as oak, ash and maple. Several large sawmills and other important wood-using industries are located in this type.

In addition to the 9,357,958,000 board feet of merchantable timber in the state, it is believed that some 36 million cords of unpeeled wood (this figure is based upon average volume per acre obtained from the Forest Resource Appraisal data of Indiana, Illinois and Iowa) is available in trees below merchantable size in all stands, in cull trees, and in the tops and limbs of merchantable trees.

From Table No. III it is evident that oak timber accounts for nearly 40 percent of the merchantable volume, and hard maple and beech together make up 25 percent. Elm, ash, hickory, tuliptree (tulip poplar), and soft maple also are important species from a volume standpoint.

Table III—Total Volume by Species in Ohio

Species	M board feet	Percentage
Red oak	1,923,999	20.6
White oak	1,751,353	18.7
Hard maple	1,241,566	13.3
Beech	1,113,938	11.9
Elm	761,984	8.1
White ash	439,282	4.7
Hickory	405,262	4.3
Tuliptree (tulip poplar)	400,100	4.3

This privately owned woodland recalls the grandeur of early Ohio forests



These tulip veneer logs brought a high price

Soft maple	393,929	4.2
Basswood	166,053	1.8
Sycamore	119,838	1.3
Black walnut	116,009	1.2
Blackgum	115,875	1.2
Black cherry	91,221	1.0
Southern yellow pine	79,827	.9
Cottonwood	39,757	.4
Black ash	36,491	.4
Honeylocust	25,095	.3
Willow	23,167	.2
Others	113,212	1.2
Total	9,357,958	100.0

With a background of such extensive timber wealth, it is not surprising that permanent and diversified wood-using industries were established in the state. A survey of these
(Turn to page 280)

Heavy cutting like this is less productive and profitable than more frequent lighter cuttings



OAK

On the High Seas

By WALDO M. SANDS

IT IS now well known that many of the mine sweepers, subchasers, airplane rescue boats, hospital ships, harbor tugs and infantry landing boats used during World War II were made of wood—principally white oak.

Perhaps it is not so well known, however, that boat builders during the war were hard pressed to obtain enough high quality white oak lumber to keep up their construction schedules. For example, 15 Michigan shipbuilders who took contracts for a large number of craft of these types drew heavily upon nearby farm woodlots and reached into adjoining

states for native timber. Even so, they found it necessary to import considerable quantities of boat stock from the southern Appalachian states and from foreign countries. This heavy exploitation of our white oak stands has resulted in a depletion of this highly specialized product.

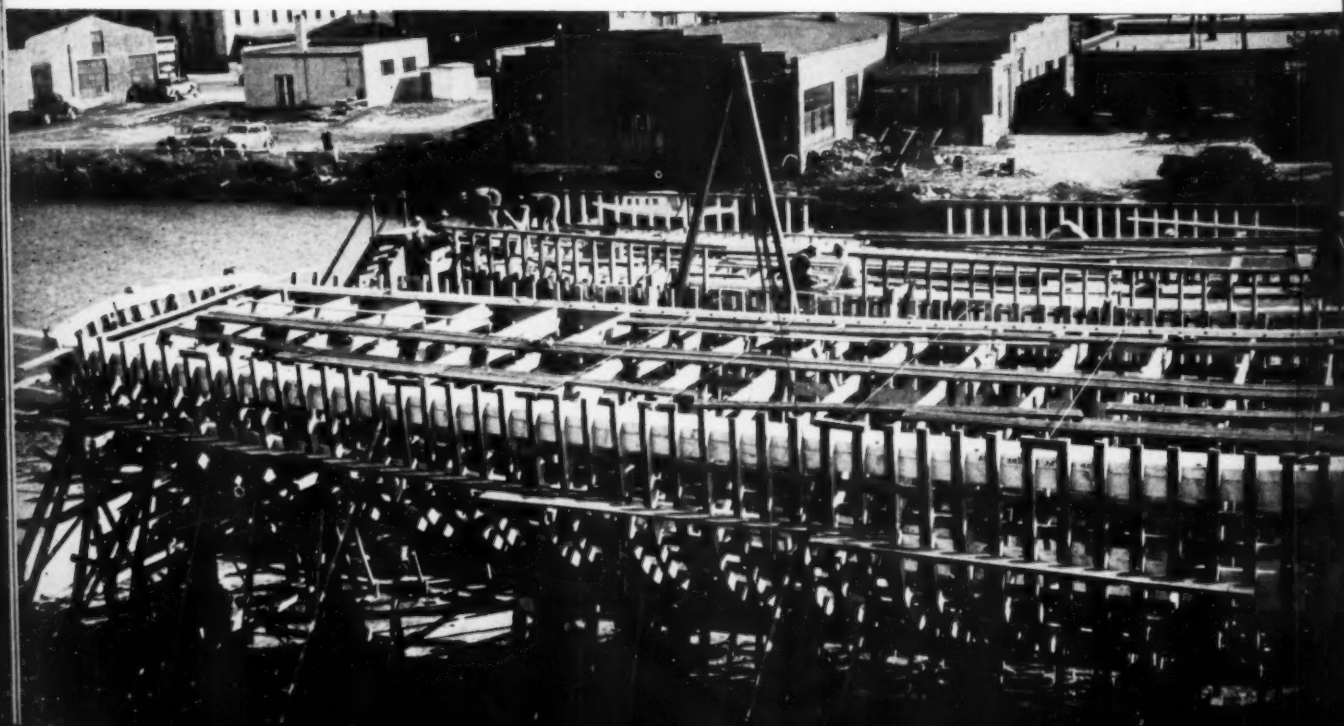
Boat timber was one of the earliest products sought in the forests, and it is interesting to note that even in the present era of highly mechanized warfare the demand for ship timbers is still extremely urgent. It suggests, among other things, that maintenance of stands of high grade timber in localities such as southern Michigan

should be a prime consideration in a program of permanent national security.

The skeleton or frame of wooden boats is for the most part made up of white oak timbers. For frame members such as keels, deck beams, sterns, stern posts and shaft logs, ribs, engine beds and horn timbers white oak must be sawn full to specified sizes and lengths and must meet sound and square edged specifications.

Bending stock primarily used for boat ribs must meet the most exacting specifications because of the severe stresses set up when ribs are

The skeleton or frame of wooden boats is made up of white oak timbers. The ribs, bent or warped into place to fit the curvature of the boat con'our, must be able to withstand severe stresses



bent and warped to fit curvature of the boat contour. Therefore, the best lumber that can be obtained from high quality timber from the white oak group must be selected for this purpose. The outside lumber cuts of the butt logs generally furnish the best material. Likewise, white oak stock used to fabricate ribs which are sawn and laminated to shape must also be of good quality.

The preferred species for wooden boat construction is the common white oak (*Quercus alba*). The swamp white oak (*Q. bicolor*) is also acceptable.

Trees which produce the best quality and largest proportion of ship stock are usually found growing on rich, well-drained soils. Bottomlands around lakes and rivers and streams often produce good oak if the soil is well drained. Sandy soils rarely produce lumber suitable for bending stock because of brashness. Occasionally, however, they produce suitable framing timber.

The best ship timber trees are forest grown in competition with other species. Open grown trees, even if large, are seldom free of knots and are apt to be wind-shaken and twisted. Leaning or crooked trees are undesirable. Twisted trees, indicated by spiral bark, are no good.

Age is not a prime consideration. However, real old slow-grown trees are apt to be brash and the lumber suitable only for heavy timber and planks. Large fast growing trees, on the other hand, are particularly desirable because of the greater amount of bending stock they will produce. Other things being equal, the larger the tree the greater and flatter the curvature of the rings and thus the more desirable it is for bending.

Heavy bending stock, for example, three by five inches, or three and a half by five inches, should be cut from logs 24 inches in diameter or larger. The smaller bending stock one and a half by two inches, or one and three-quarters by two inches, can be cut from logs 16 inches in diameter. Preferably the trees should be tall, straight, long boled, free of limbs and knots with little taper in the first log. If possible, the first log should be clear at least for 24 feet, which will cover the longest bending stock needed.

A stagheaded tree—one with a dead top or with many dead limbs near the top—and a tree with a great deal of gray moss covering the bark

indicating that it is overmature, are usually passed up. It may be seen from this that trees suitable for select boat stock are not generally found in quantity but must be carefully selected as individuals.

Not only must boat-timber trees be selected carefully, but the greatest possible care must be exercised in preparing them for use. Sawing a white oak log into bending stock requires careful study. The log should be cut parallel to the grain and should be cut parallel to the grain and should be taper-sawn. Following removal of the first slab, the log should be turned down and another slab removed. As bending stock must be sap free, removal of the slab cut will take care of this unless sapwood is unusually thick.

To obtain the maximum quantity of bending stock, the log should be turned for each cut so as to yield pieces with wood rays at right angles to width of plank and with growth rings in as flat a curvature as possible. Since the greatest radius or longest curvature occurs in the outer portions of the log, the best and widest pieces of bending stock can be obtained there.

The narrower and thinner bending stock should be sawed full or to the same thickness as the wider stock to permit economical resawing of the plank at the boat plant.

The specific gravity or density of lumber is also highly important in the selection of the best boards for bending stock. Wood of high density is desirable because of its superior strength. Lightweight or brash wood, in which the pores in the least porous part of the annual ring are visible without magnification, is not acceptable. A practical method of applying specific gravity tests is needed to aid in solving the problem of selection of bending oak.

Because of the exacting requirements not only for quality of wood, but also in its preparation, it is understandable that boat companies would have considerable difficulty in getting the relatively large quantities needed in an emergency period such as from 1942 to 1945.

To meet the exacting requirements of naval vessels during the war, boat-timber trees were carefully selected and the planks especially sawn for greatest strength



Laminated keel, built up from thin oak material

Mention should be made of the progress in the lamination of ship timbers during the war. Several long keels and rib sections were successfully laminated from thin oak material. This is a significant development because it will result in greater utilization of our oak timber, reduced wood waste, and ship members possessing greater strength and durability than those made of solid wood.

Now that requirements are more completely understood, foresters and woodlot managers throughout the country will have a better basis for planning a reserve of suitable boat timbers for potential future emergencies and to meet the day-to-day requirements of civilian boat building.

Texas Timberlands and State Forestry

(From page 273)

lic relations setup. People are induced to support forestry as a worthwhile state activity; traditional woods burners are hammered at to desist, and in school their children are taught new attitudes toward fire; timber owners, lumber manufacturers, businessmen all over east Texas are made to feel that they have a stake in forestry. Yet there is a realistic acceptance of the fact, known to all workers in the public relations vineyard, that no single brilliant stroke will ever accomplish much; that the task is unending and demands working every day, in every possible way.

Take the matter of fire protection. Serious effort to protect forests from fire began in the 1920's. For 10 years following 1924, slightly over seven million acres were under state patrol, and during the last decade between eight and nine million acres have been protected. Nearly a million acres are given intensive protection beyond the average because landowners are willing to pay extra for it. The 20-year average number of fires is 3,882, and on the average 213,871 acres have been burned over each year. In 1946, a total of \$286,000 state, federal and private funds will be available for protection of state and private lands.

Viewed cold-bloodedly, such a record falls short of satisfaction, because there are still too many fires every year, and in some years the burn amounts to vast totals. There still are many rural dwellers who insist upon setting fires to dried vegetation when the spirit moves them. And conviction of such people for law violations is a difficult chore. Yet, convictions are obtained every year, and along with the majesty of the law goes education by means of moving pictures, field demonstrations, camp schools for youngsters, news stories and editorials (circulated widely by a highly cooperative press), periodic radio programs and other contact work.

After 20 years of such attempts at first protection, it may be fair to sum up by stating that organized effort probably has improved soil fertility and the growth rate and quality of timber on many thousands of acres of woodland. It has put before the eyes of country people 72 lookout towers, more than 100 business-like patrolmen, smoke-chasers and lookout men—insistent upon suppressing fires, spectacular airplane fire spotters overhead, and many other media of information, with the steadily growing result of interesting these

landowners in managing their woodlands for timber production. True, the larger landowners are more responsive to such stimuli, and quicker to adopt management plans, than are small. Yet, when any landowner really sets about growing timber, the fire problem, like other forestry problems, moves a bit nearer solution.

Forestry education—information, publicity, call it what you will—must miss no opportunity to tell its story to the public. Promises of individual and public benefits to come from the practice of forestry gain color and credence as accomplishments are made known to all. The progress of research, enlargement and development of state forests, establishment of new community forests by forward-looking towns, the inauguration of 93 "tree farms", totalling 1,785,687 privately owned acres, aid given to many small woodland owners, wartime soldier caravans to promote wood production, circulation of Texas-made educational sound movies; all these activities, in themselves, productive of forestry results, are publicized and made to do double duty in stimulating interest in the state Forest Service.

Incidentally, it should be noted that some Texas schools are teaching forest conservation and use at several levels from elementary grades to teachers' college. This program is being developed systematically, under the college influence. Everett F. Evans, school education specialist, who prepared resource-use teaching manuals in Missouri and elsewhere before the war, is now hard at work in the Texas Forest Service headquarters at College Station. Recognizing that teachers are usually expected to do much with little outside help, he will supply them teaching tools ready-made for their use.

The Texas Forest Service is enthusiastically supported by industrial and civic groups, and the service reciprocates in a practical way by offering to timbermen and farmers the best efforts of a rapidly expanding laboratory for the study of wood utilization problems. Reports upon possible uses of the ubiquitous mesquite and improved methods of kiln drying certain hardwoods are recent fruits of research. There are indications that the present yearly budget of \$17,000 will be increased several fold for the next biennium, by the legislature.

In east Texas the Chamber of Commerce, the Texas Forestry Associa-

tion and the lumber manufacturer's association recognize such forestry activities as contributions to maintenance of business and industry and the betterment of rural conditions. Texans bracket agriculture and oil as their preeminent industries, and the well-informed place forestry third in importance. In 1944, timber products were valued at over \$100,000,000. Nearly 30,000 workers were regularly employed, earning in excess of \$36,000,000.

Sawmills of all sizes number nearly 600, while 165 other primary conversion plants make baskets, cross-ties, poles and cross-arms, handles, toys and other goods. One plant produces activated charcoal. Two pulp and paper mills within the state and several outside keep upwards of 300 pulpwood buyers busy supplying their raw materials.

In 1944, the cut of sawtimber size trees, for various uses amounted to 1,580,600,000 board feet (nearly three-fourths pine), according to U. S. Forest Service estimates. Something like 2,042,900 cords of wood went into industrial and farm use. Altogether, including 186,500 cords of usable wood destroyed in land-clearing, the 1944 drain upon Texas forests is estimated at 4,640,700 cords of wood.

Nearly two-thirds of the timber harvested in Texas is consumed within the state. This heavy per capita consumption of forest products both in and outside the commercial forest region lends added weight to the forester's argument that their work benefits all Texans and deserves state-wide support. After 20 years of solid preparation, during which annual state expenditures have been slowly stepped up to slightly less than \$200,000, the time appears ripe for seeking legislative support for a mighty expansion. It is proposed to increase state funds for forestry to more than \$1,000,000 annually, so as to provide adequately for protection, education, research in growing and using timber, and assistance to forest owners in growing trees.

It will be interesting to watch the development of state forestry from its strictly industrial beginnings in east Texas to a state-wide enterprise concerned with soil and water conservation, shelterbelt planting and recreation. However, for the present and near future the story of Texas tim-

(Turn to page 295)

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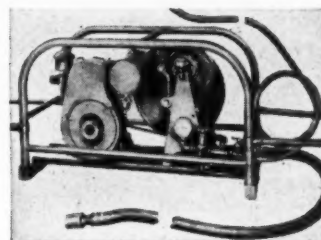
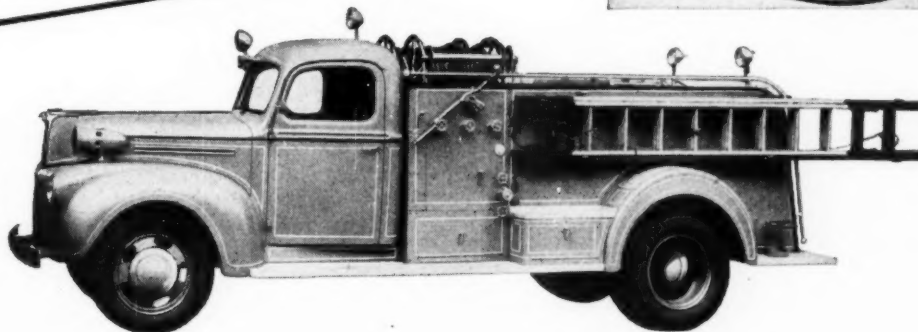
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BUILDERS OF BEAN HIGH-PRESSURE PUMPS FOR OVER 60 YEARS

Forests of the Buckeye State

(From page 275)

industries in 1942, showed that there were over 3,000 of the primary type (those that process logs, bolts, etc., or raw timber products) in the state at that time and that nearly two-thirds of these operated on a yearly basis. In the year 1942, there were about 1,800 sawmills of all classes from small farmer-owned portable mills that operate only a few days out of each year, to mills that produce two to four million board feet annually. The total full-time employment of the sawmill group is about 4,000 persons per year. The production of veneer logs for export, hewn crossties, mine timbers, poles, and piling gives part-time employment to some 2,000 other workers.

Other primary industries in Ohio are handle plants, basket factories, cooperage mills, pulp mills, and fine veneer plants. All told, these give employment to about 4,000 full-time employees.

When all manufacturing plants that process wood, wood fiber or chemical derivatives of wood are considered, employment is provided for more than 63,000 full-time workers and around 33,000 part-time workers.

The importance of all types of wood-using industries in the economic structure of the state is brought out by the comparison of the value of the primary forest products, i. e., logs, bolts, etc., cut from the state's woodlands and annual value of manufactured products either in the form of wood or derived from wood. The first group has an estimated value of \$10,000,000 while the latter has a value of \$289,000,000 yearly.

To the woodland owners the \$10,000,000 figure is an important one. On the basis of the number of farms in the state in 1940, this is an average value of woodland products of \$40 a farm.

From the state standpoint, it is important to know the condition of its timber budget. The overall consumption of lumber in the state, both softwood and hardwood, is believed to be between six and seven times the annual amount produced within the state. However, when only hardwood lumber consumption is considered, the ratio of consumption to production is approximately two to one.

The amount of lumber and other sawn products produced by the sawmills of the state in 1942, was over 270 million board feet. Leading counties in the annual cut of lumber were Ashtabula, Harding, Hocking, Holmes, Pike, Trumbull, Vinton, and Washington. Nearly 50 percent of the volume was produced by 12 percent of the active mills in the state. In addition to the lumber cut from Ohio, woodlands furnish annually 1,400,000 cords of fuelwood, 6,000,000 fence posts, 2,500,000 mine props and other timbers used by this industry, 40,000 cords of pulpwood, 400,000 hewn ties, and 28,000 cooperage staves, plus many other products.

The annual drain of hardwood products is about 300 million cubic feet. Against this drain, the growth is estimated at 177 million cubic feet a year. The drain then is about 1.7 times the growth.

In sawtimber stands, particularly in grazed stands, the drain-growth ratio is more serious and has been set closer to three to one on the basis of limited growth studies made in the state. Unbalanced as this ratio is at present, a reduction in the practice of grazing woodlands and a conscious effort to build up growing stock would change this situation from an unfavorable status to a favorable one. If growth per acre can be brought up to 150 board feet and if much of the 1,500,000 acres of open land which is economically best suited for timber growth can be restocked with trees, the goal of balancing the timber budget can be attained.

During the war, the forests of Ohio supplied large white oak timber for ships, high quality tulip poplar logs for aircraft veneer, lumber for truck bodies, and agricultural implements, and a large volume of blocking for the steel industry of the lake area around Cleveland. Much native timber was used also for the construction of farm buildings such as dairy barns, hog houses and corn cribs which aided in maintaining the flow of food products for war needs.

Undoubtedly, in some areas the war demands aggravated overcutting, for a general belief prevailed that after the war, timber prices would go down. However, forestry educational work with woodland owners was expanded during the war and more timber was removed under technical supervision than ever before because of the efforts of state and federal foresters. In the aggregate, however, these men could only reach a small number of woodland owners who sold timber during the war period.

The greater number of farmers, and it is this class that owns more than 65 percent of the total woodland acreage, harvest their timber with little or no thought to maintaining the productivity of their woods even though they consider the area only suitable for tree growth. A study by Dr. O. D. Diller, associate forester at Ohio State Agricultural Experiment Station and H. R. Moore, agricultural economist at Ohio State University, in five north central counties brought out that most owners clear-cut their woods of all trees above six to twelve inches in diameter about every 30 to 45 years, (usually this is stump diameter rather than diameter at breast height). Such stands were found to yield only about \$1.50 an acre a year as compared to about \$3 an acre for stands cut at intervals under 10 years. In the latter, only the larger crop trees were removed. This method of cutting maintains greater growth rates and usually results in higher stumpage prices for the trees sold.

As stated previously, 65 percent of the timberland of the state is owned by farmers. However, around 95 percent is in private ownership. Coal companies in the southern part of the state own close to 500 thousand acres of woodland. The remainder of the land in private ownership is in the hands of sawmill operators and others.

A glance at Table IV shows that most of the publicly owned land is in state forests, state parks, etc. The U. S. Forest Service ranks second in the amount of forest land owned. In the Wayne National Forest, there are more than 76,000 acres, but only 38,384 bear forest cover.

The extent of forest land in community ownership and in conservancy districts shows leadership in these important phases of forest land use.

Table IV—Forest Ownership in Ohio

		Acre
Private		3,514,377
Farmwoods	2,408,190	
Industrial	453,647	
Other	652,540	
State		123,511
Division of Forestry	107,623	
Division of Conservation and Natural Resources	11,300	
Other	4,588	
United States Forest Service		38,384
Community		19,276
Conservancy Districts		12,410
Muskingum Conservancy District	7,200	
Miami Conservancy District	2,060	
Mahoning Sanitary District	3,150	
Total		3,707,958

In fact, Ohio was one of the first states to recognize the importance of public leadership in forestry affairs. As
(Turn to page 289)

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CONSERVATION IN *Congress*

By A. G. Hall

For what is probably the first time in the history of the labor movement in this country, organized labor has assumed leadership of national legislation affecting forest conservation and land use policies. Two bills, H. R. 6201 and H. R. 6221, recently introduced, stem, it is reported, from the Congress of Industrial Organizations (CIO). Both bills provide for federal management of forest lands, one bill involving the federal acquisition and control of redwood producing lands in California, the other setting up federal regulation of cutting practices on private lands, and an augmented forest land acquisition program.

Critics of the bills doubtless will see "national socialism" written between the lines; but they will also see, especially in H. R. 6221, a number of measures which have been advocated by foresters as steps necessary to the establishment of forestry as part of the timber-growing business. The measures are presented at a price—federal regulation of cutting rates and practices.

While not a U. S. Forest Service bill, H. R. 6221 contains some features which have the approval of that agency. It is the most far-reaching conservation bill to be introduced in the Congress. Starting with a statement of forest policy to the effect that forestry is a basic part of the nation's agricultural economy, that the most productive 80 percent of all United States commercial forest lands are privately owned, and that 70 percent of these have been cut without regard for future productivity, the bill establishes federal regulation of timber cutting on privately owned forest lands. Control is vested in the Secretary of Agriculture who would be advised by a 12-man National Forestry Board made up of representatives of farmers, forest operators, forest industries, forest labor and wildlife groups, transportation, water conservation and utilization, and consumers.

The Secretary of Agriculture would be empowered to classify all privately owned lands as forest or non-forest, and through regional administrators and regional advisory boards establish rules of cutting.

In addition to the regulatory measures, the bill provides for payments or grants of aid to forest operators for certain forest practices; technical assistance and guidance to forest owners and operators; establishment of forest credits; distribution of nursery stock; control of insects and diseases; forest insurance; a safety program for forest industries; a public works program on forest lands; promotion of forest cooperatives; augmented federal forest land acquisition; and better management of federally-owned lands on a sustained yield basis.

Practically the entire redwood type from the Oregon state line through to the redwood's southern limits in California is included within the boundaries of the Franklin Delano Roosevelt Memorial Redwood Forest, as proposed in H. R. 6201 by Mrs. Douglas of California. Chosen as a memorial because it comprises "the natural habitat of the most nearly immortal of all living things", the forest boundary would include four memorial tracts in its northern half. These would be administered by the Department of the Interior, but the remainder of the area, except that excluded because of settlements, if it supports mature stands of redwood trees would be operated as a national forest under the Secretary of Agriculture. Specifically exempted are any lands acquired and held by or for conveyance to the state of California, lands held by or for the naval or military forces and existing national parks and monuments. Provisions for the harvesting of timber on a sustained-yield basis are included.

Reducing the Department of the Interior's budget estimates by almost

50 percent, the House Committee on Appropriations criticized the department for extravagance and inefficiency in the past, and expressed the hope that under the leadership of Secretary Krug, the department will be placed on a more efficient basis. Although the budget estimates were reduced from \$346,765,830 to \$174,652,579, the net reduction from the 1946 appropriation is slightly more than \$24,000,000.

The House bill would effect a net reduction of \$868,970 in funds for the Grazing Service, as compared with the 1946 appropriation; while salaries and expenses are cut \$908,970, funds for range improvements are increased \$90,000; an item of \$50,000 for fire fighting is deleted, but actual fire fighting costs are generally taken care of with supplementary appropriations.

In the General Land Office items, \$12,089 is deducted from last year's figure for administration of Oregon, California and Coos Bay grant lands, \$1,570 added to funds for range improvements outside the grazing districts, and \$221,455 more is proposed for protection and timber management of the public domain.

In recommending a total of \$704,728 for the management of Indian forest and range resources, the committee disallowed all proposed increases with the exception of funds necessary for reallocations and within-grade promotions.

Under the House bill the National Park Service would receive an increase of \$12,605,558, but almost \$17,000,000 less than had been proposed in the budget.

The Fish and Wildlife Service received both the commendation of the Committee and an increase of \$1,452,824 over last year's funds, but this is \$2,873,026 less than the budget had suggested.

For soil and water conservation activities, the Committee proposes an increase of \$186,430, or \$290,000 less than that proposed by the budget.

The recommended appropriation for the Bureau of Reclamation is \$72,271,475, which is \$45,000,000 less than the 1946 figure and \$94,000,000 less than the amount proposed in the budget.

The McCarran Bill (S. 33) to prohibit the Forest Service from making reductions in grazing permits for the purpose of distributing to other permittees the portions of the grazing privileges taken from permittees thus reduced, has been reported favorably, with amendments, by the Senate Committee on Public Lands and Sur-

(Turn to page 284)

AROUND THE WORLD

More Foresters Join MacArthur

Two more U. S. foresters have left to join General Douglas MacArthur's civilian forestry organization in Japan, replacing military members who are returning to this country. The forestry staff consists of 27 trained foresters, mostly transferred from the battle units that conquered the Japanese. The two recent civilian additions to the staff are John A. Scholten, formerly of the U. S. Forest Products Laboratory at Madison, Wisconsin, and Percy E. Melis, who was supervisor of the Kaniku National Forest, Idaho.

Before the war, the Japanese imported large amounts of timber and wood products from the United States and other countries while conserving their own large stands of fir, spruce, pine and cedar. The task of General MacArthur's foresters is to see that the Japanese forests from now on are managed to produce for Japan's own needs the maximum amount of timber without wrecking the forests themselves, and thus reduce the export drain on the already overtaxed forests of other countries.

Russia Plans Increased Lumber Cut

Lumber production in the Soviet Union during the next five years is scheduled for a 30 to 40 percent increase over the prewar output, according to the Soviet press. The program calls for the promotion of lumbering in the Soviet's 3,700,000 square miles of forest tracts, which amount to about one-third of the total forest area of the world.

National Tribute Grove Progresses

Steady progress is being made in the acquiring of funds for the purchase of redwood forest land for the National Tribute Grove in California, a memorial to the men and women of the armed services of the United States in World War II. To December 31, 1945, a total of \$64,456 had been contributed to the fund. Since the funds given through the Save-the-Redwoods League are matched in equal amount by the State of California, the contributions thus far obtained will provide for saving redwoods valued at double the sum of the contributions.

Two parcels of land already purchased in the grove represent an expenditure of \$104,444, including the state's contribution. This is in addition to the value of redwood lands within the National Tribute Grove boundaries when it was established—approximately \$200,000 of which one-half was given through the Save-the-Redwoods League and one-half by the state.

Puerto Rico Investigating Cinchona

Experiments to determine environmental and cultural factors essential to the development of two species of cinchona, the tree from which quinine is obtained, are being conducted by the Federal Experiment Station at Mayaguez, Puerto Rico. By selection and breeding of various strains and varieties, it is hoped that cinchona may be produced in the Western Hemisphere that will be equal or even superior to that possessed by the Java industry before the war.

Record Fishing Year Expected

The U. S. Forest Service expects that the year 1946 will establish a new record for the number of fishing days spent in national forests. The fishing streams and lakes in the 152 national forests were used in 1944, the last year for which statistics have been compiled, by 1,450,000 anglers, who spent a total of 2,210,000 days in the woods. All indications are that these figures were surpassed in 1945. To meet the expected postwar increase in fisherman visitors to the forests and to make up for the drastic reduction in fish planting during the war, Forest Service officials see a need for many new fish planting and stream improvement projects.

Britain Trains Forest Workers

To restore Britain's forests and increase the present forest area from three million to over five million acres, a vocational training plan has been established by the British Forestry Commission in cooperation with the Ministry of Labour and National Service. Some five thousand war veterans are to be trained immediately, and eventually 20 to 30 thousand workers will be trained.

Find Superior Rubber Trees

Rubber trees of apparently much greater productivity and disease resistance have been found by jungle explorers of the U. S. Department of Agriculture and the Ministries of Agriculture of Colombia and Peru in the upper regions of the Amazon Valley. Some of these outstanding trees promise, after testing, to prove better than the best of the plantation trees now providing most of the world's rubber.

Two plant specialists of the Agricultural Research Administration — Richard Evans Schultes in Colombia, and Russell J. Seibert in Peru—have been ransacking the wild region of the upper Amazon in Colombia and Peru. They have brought back budwood from the most promising trees for testing in plantation nurseries at Tingo Maria, Iquitos and Iberia, all in Peru; Belem, Brazil; Turrialba, Costa Rica; and Leticia, Colombia.

Altogether they have located a hundred or more trees that apparently combine the characters of high yield and resistance to leaf blight, and the best of these are expected to provide propagation material for highly productive plantations.

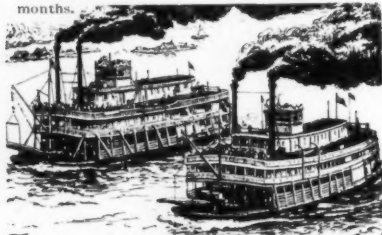
ACL Railroad Appoints Forester

The Atlantic Coast Line Railroad has announced the appointment of Paul W. Wright as industrial forester, with headquarters at Wilmington, North Carolina.

"Recognizing the importance of forest products in the economic system of six southeastern states served by the Coast Line", R. J. Doss, traffic vice-president said in making the announcement, "the management feels that the services of a trained forester will prove of great value to landowners and industries in the area."

Forester Wright's duties have been outlined as consisting specifically of advice to landowners on such subjects as fire control, cutting, reforestation, insect control, timber sales and other modern forestry practices. He will also be available to managements of pulp and paper mills and other large users of forest products.

Steamboats on the Ohio in the 1890's. The riverboats that carried passengers, freight and the U. S. mail. Travelling mostly by river-boat and stagecoach, the two partners who established our business in 1851, made regular trips across the country in the 1870's, 80's and 90's to supply the demand for their pipes. A trip took them 8 months.



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veys. The amendments would limit the prohibition to actions affecting the holders of 10-year permits.

The bill would assure present 10-year permittees a lasting right to present range privileges, even to the extent of permitting them to pass on privileges with the sale or exchange of ranch base properties. Both the Secretary of Agriculture and the Secretary of the Interior have spoken against the bill as a device to confer upon large permittees a perpetual

right to monopolize all permitted use of the national forest ranges. It would be inimical, they contend, to the interests of persons holding small family-type grazing units, upon whom its provisions would cast the brunt of any major reduction in overall range utilization that might become necessary. Another and less controversial provision of the bill is to provide specific legislative authority and requirements for grazing advisory boards.

CONSERVATION CALENDAR

Important Bills in Congress With Action to May 10, 1946

Appropriations

H. R. 5400—Thomas—Making appropriations for the fiscal year ending June 30, 1947 for civil functions administered by the War Department. Conference report agreed to by both House and Senate. Approved May 2. Public Law 374.

H. R. 5890—Cannon—Making appropriations to supply deficiencies in certain appropriations for the fiscal year ending June 30, 1946. Sent to conference April 30.

H. R. 6335—Making appropriations for the Department of the Interior for the fiscal year ending June 30, 1947. Reported in House May 7 (Report No. 1984).

National Forests

S. 33—McCarran—Relating to the management and administration of national forest grazing lands. Reported with amendments (Report No. 1176) April 12.

H. R. 2854—Engle—To add certain public and other lands to the Shasta National Forest, California. Passed House April 15.

H. R. 6201—Douglas—To create the Franklin Delano Roosevelt Memorial Redwood Forest. Referred to the Committee on Agriculture April 10.

National Parks

H. R. 5317—Norrell—To amend the act establishing the Hot Springs National Park. Passed House March 18. Reported in Senate (Report No. 1263) April 29.

Governmental Functions

H. R. 6221—Hook—To further the conservation and proper use of publicly and privately owned forest lands. Referred to the Committee on Agriculture April 30.

H. R. 6262—Barrett—To transfer the U. S. Geological Survey of the Department of the Interior to Casper, Wyoming. Referred to the Committee on Mines and Mining May 1.

Fish and Wildlife

H. R. 3821—Robertson—To amend allocation percentages of Pittman-Robertson Act funds and to provide for maintenance of completed projects. Passed House May 7.

H. R. 6097—Robertson—to amend the act of March 10, 1934, entitled "An act to promote the conservation of wildlife, fish and game, and for other purposes." Reported in House (Report 1944), April 17. Passed House May 7. Referred to Senate Committee on Agriculture and Forestry May 8.

Public Lands

S. 2126—Hatch—To provide for the disposal of materials or resources on the public lands of the United States which are under the exclusive jurisdiction of the Secretary of the Interior. Referred to the Committee on Public Lands and Surveys April 29.

Water and Stream Control

H. R. 6024—Mansfield—Relating to the prevention and control of water pollution. Reported with amendments (Report No. 1929) April 13.

H. J. Res. 225—To quiet the titles of the respective states and others, to lands beneath tidewaters and lands beneath navigable streams within the boundaries of such states and to prevent further clouding of such titles. Passed House September 20, 1945. Reported in Senate April 26 (Report No. 1260).

Soil Conservation

S. 1414—McKellar—To assist in soil-conservation and water conservation work by making certain surplus materials, equipment, and supplies available for such work through the distribution thereof, by grant or loan, to public bodies organized under state laws. Passed Senate October 19, 1945. Failed of passage in House under suspension of rules April 15.

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3. Mail a box of 50 Bookmatches once every month to each of your customers. This can be accompanied by a goodwill-building or sales-getting letter or card.
4. Use your Bookmatches as calling cards. Have your representatives use them, too.
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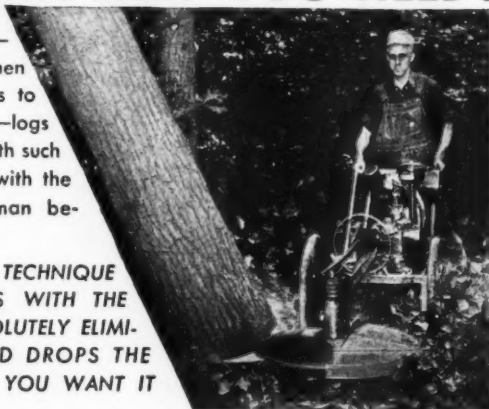
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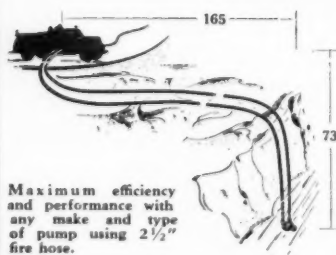
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New Weapons

(From page 259)

So far, tests have been made with water, foams, various liquid chemicals, dusts and powders. These have been dropped from bombing planes, generally flying at low altitudes, although dive bombing will be tested this summer because of its greater accuracy.

Among the types of bombs tested have been those bursting on impact with the ground and those exploded at various levels within or above the forest. When a container with 6,000 pounds of water hurtles to hard ground or rock, it bursts on impact and scatters water effectively in a satisfactory wet pattern. But when such a bomb hits soft soil, most of its fire extinguishing load is spent in its own crater.

Bombs with electrically - ignited time fuses have been developed to burst at determined heights above the fire. Explosive bombs have been tried to scatter earth over the blaze.

Great promise is seen in the formerly secret radio-proximity fuse, which automatically explodes the bomb at exactly the right time. These were used to drive the Japanese planes out of the Pacific air. It appears now that the tiny mechanism, small enough to hold in one's hand, will be just as accurate against forest fire as it was against Kamikaze planes.

Experiments may be made this summer with heat-attracted bombs which of themselves will plunge toward the center of the flames.

The U. S. Forest Service has acquired eight planes from surplus Army property. These are to be used for experimental work and where commercial contract planes are not readily available. By use of its own planes, the Forest Service will be able to install equipment and make alterations not desirable on craft which may be used also for commercial purposes.

Although the airplane will develop into an important piece of fire control equipment in many sections of the country, much of the fire control work will still be a ground job. Men will continue to travel to fires in trucks and on horses, and even on foot, and will continue to use line-building tools, and back-pack pumps, such as we have known in the past, where conditions warrant their use.

Of great promise in the field of transportation are the jeep and other

four-wheel or all-wheel drives. The jeep makes an excellent crew carrier. It can be used to haul equipment, and can be equipped with pumping and power devices. The first of the war-designed automotive units to come on the civilian market, it will see service this year in a wide variety of woods situations.

Other heavier trucks with all-wheel power likewise will be adapted to fire control. Here also, the half-tracks, equipped both with wheels and tractor tread will make their appearance as transporters of heavy equipment and as tankers.

A light trail tractor, developed prior to the war by the U. S. Forest Service was used by the Army in airborne operations. Excellent for the repair and maintenance of airfields, it can be used to advantage in fire line building. Moreover, completely equipped with blade and plow, it can be loaded on a half-ton truck for quick transportation to the scene of the fire.

Other line-building devices are the "Westcoast Plow" developed in Oregon, the "Ranger's Pal", a double-disc plow for use in the South, and the "Michigan Linebuilder" or self-propelled trenching machine which has been developed by the Michigan Department of Conservation. Likewise, the "Bosworth Trencher", widely accepted before the war, will be improved for more general use.

The development and use of fog nozzles is not new, but the war has provided a testing field for these devices, especially against oil and gasoline fires. Breaking a gallon of water into anywhere from 20 million to seven billion particles, these fog producers control or extinguish fire by lowering the temperature of the fuel and by smothering the fire or cutting off its oxygen supply. By atomizing the water, they put each drop to its greatest use and thus are water conservers, an important consideration when water must be transported long distances.

In forestry circles, the question regarding the fog application is not concerned with fog's value, but with whether high-pressure (500 to 800 pounds per square inch) or low-pressure (100 to 200 pounds) fog should be used. High-pressure nozzles use less water, provide greater velocity than do the low-pressure nozzles, but the high-pressure equipment is more costly and demands special hose.

It is safe to predict that both types

(Turn to page 293)



STRAIGHT AS A HELICOPTER FLIES!

● If you live near a large city, how long does it take you to reach the airport through traffic from mid-town? Or if your home is in a smaller town, how much time do you lose in getting to a point on one of the air lines? Fortunately, *helicopter* feeder-taxi service is being developed as the solution to these difficulties.

A notable flight is recorded in the picture above—the first direct helicopter trip from Philadelphia's Southwest Airport to a roof in the center of that city. Mail was picked up and delivered to a waiting Europe-bound air liner. The distance this helicopter flew is 4 miles. The flight took 4 minutes. By city streets the trip is 8 miles—and takes 25 minutes! Yet Philadelphia is fortunate in having its airport much nearer mid-town than most cities.

A helicopter takes off and descends vertically. Its landing area need be no larger than a tennis court. Its cruising speed, *straight across country*, is about 90 miles an hour.

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KELLETT HELICOPTERS

ENOUGH AND TO SPARE, by Kirtley F. Mather. Published by Harper & Brothers, New York and London. 186 pages. Price \$2.00.

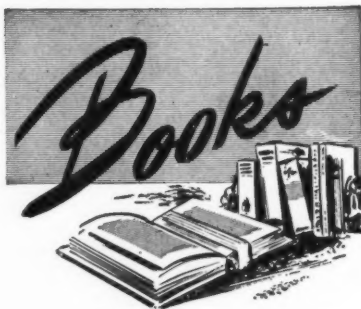
Professor Mather analyzes the fundamental laws of nature and sets down three important facts: (1) The earth's principal resources exist in quantities ample for the needs of mankind for generations to come; (2) the justification for war on the Malthusian theory that the earth's human population is increasing faster than the food supply and therefore needs to be reduced by killing, is not borne out by an analysis of the facts, and (3) cooperation, not competition, is the key to survival. He concludes that a consistent application of the principles of international cooperation and sharing of resources among nations will go far toward eliminating the possible grounds for future armed conflict.

FOOD OR FAMINE: THE CHALLENGE OF EROSION, by Ward Shepard. Published by The Macmillan Company, New York. 210 pages illustrated. Price \$3.00.

The author raises the question: what must be done to rebuild and stabilize our land and water resources? His answer is to provide more soil conservation districts, set up forest conservation districts and river valley authorities. He finds the approach of the Soil Conservation Service, with its emphasis on (1) helping the farmer to help himself and (2) treating an entire watershed as the unit of conservation strategy, admirably suited for the farming aspect of the conservation job. He discusses the shortcomings of the Extension Service and recommends merging it as an educational arm of the conservation districts.

THE WISCONSIN PINE LANDS OF CORNELL UNIVERSITY, by Paul Wallace Gates. Published by Cornell University Press, Ithaca, N. Y. 265 pages, illustrated. Price \$3.50.

The Agricultural College Act of 1863 granted lands to the states for the purpose of endowing agricultural colleges. This was almost equivalent to making land speculation a public policy. In this hazardous business most states were disappointed; but New York State and the college which it chartered managed their land scrip with outstanding success. With a grant of half a million acres, an endowment of \$5,000,000 was obtained within thirty years.



The story, with its background laid in the great days of Wisconsin's lumbering, is of absorbing interest and is a real study in government land policy.

HOW TO KNOW THE MOSSES, by Henry S. Conard. Published by Wm. C. Brown Company, Dubuque, Iowa. 166 pages, illus. Price, \$2.50 cloth bound; \$1.50 spiral bound.

A complete key to a fascinating but less widely-known group of plants.

ROSES IN COLOUR AND CULTIVATION, by T. C. Mansfield. Published by E. P. Dutton and Company, New York, N. Y. 264 pages, illustrated. Price \$3.75.

Profusely illustrated with exceptionally beautiful color photographs, this book contains all the essential information for the cultivation of roses. Limited to roses and species known to be in cultivation, the first chapter contains many impressive facts about the history of the rose, its effect on the lives of men during past generations and accomplishments it has inspired. This book could not have been written by anyone who did not truly love his subject.

PLANTS AND PLANT SCIENCE IN LATIN AMERICA, edited by Dr. Frans Verdoorn. Volume XVI. Published by the Chronica Botanica Company, Waltham, Massachusetts; G. E. Stechert and Company, New York City. 381 pages, illus. Price, \$6.00.

An enormous amount of knowledge covering a wide field is presented here in a series of short articles by the most distinguished scientists in each field. The economic and social aspects are covered as well as the scientific. The result is a well-organized, readable volume indispensable to anyone whose horizon includes Latin America and the excellent plates, maps and drawings enliven and illustrate the text.

Book Listings

Wood Products for Fertilizer—Report of Conference at Orono, Maine, June 29, 1945. Northeastern Wood Utilization Council, P. O. Box 1577, New Haven 6, Conn.

Maryland Board of Natural Resources—Annual Report 1944. State Office Building, Annapolis, Md.

Delta Bottomland Hardwoods—A report on bottomland hardwood research and utilization. Delta Council, Stoneville, Miss.

Establishing and Operating a Small Sawmill Business, by Joseph L. Muller and H. B. McCoy and co-operators. Supt. of Docs., Wash., D. C. Price 35 cents.

Southern Pine Bark Beetles, Bull. 33; **The Southern Pine Sawyer**, Bull. 34, and **Pine Tip Moth**, Bull. 35—all three by D. A. Anderson, published by the Texas Forest Service, A. & M. College, College Station, Tex. Free upon application.

Cottonwood—A Promising Tree for Intensive Management, by Henry Bull. Chem. Reprint Series No. 14 (price 25 cents); **Douglas Fir Plywood in Review**, by W. E. Difford. Chem. Reprint Series No. 9 (price 50 cents); **Extractives of Northeastern Woods**, by Robert S. Aries. Chem. Reprint Series No. 23 (price 50 cents); **Bamboo Culture in the Americas**, by F. A. McClure. Chem. Reprint Series No. 27 (price 25 cents), and **Chemical Economics of Wood Hydrolysis**, by Edward Farber. Chem. Reprint Series No. 17, all reprints published by The Chemurgic Digest, 50 West Broad Tower, Columbus 15, Ohio. **Growth of Aspen**, by George Tunstall. Silvicultural Research Note No. 77, Dominion Forest Service, Ottawa, Canada.

Knot-Free Red Pine by Debudding, by A. Bickerstaff. Silvicultural Research Note No. 76, Dominion Forest Service, Ottawa, Canada.

Irrigated Pastures, Farmers' Bulletin No. 1973, U. S. D. A., Supt. of Docs., Wash., D. C. Price 10 cents.

What the Forests and Forest Industries Mean to Mississippi, Mississippi State Forest Service in cooperation with U. S. Forest Service, Jackson, Mississippi.

Federal-State Cooperative Snow Surveys and Irrigation Water Forecasts for Columbia Basin, by Division of Irrigation, Soil Conservation Service, U. S. D. A.

Game Birds and Animals of Manitoba, issued by The Travel and Publicity Bureau, Department of Mines and Natural Resources, Winnipeg, Canada.

Buckeye State

(From page 280)

early as 1904 forest research work was begun in the Department of Horticulture and two years later this attained separate departmental status under Edmund Secrest. In 1921, Mr.

FORESTRY CAN AID COAL PRODUCTION

Some time ago, the Ohio Reclamation Association announced the 1946 tree planting on 1,378 acres of land turned up by strip-mining of coal in six eastern Ohio counties. Beside the 1,135,000 trees (tulip-tree, locust, white pine, red pine) planted upon the holdings of several mining companies, 66,500 seedlings were set out in six special plots now used for research into the problems of spoil bank rehabilitation by the Central States Forest Experiment Station of the U. S. Forest Service.

In the February issue of *Hanna Coal News*, there is an interesting story about wood post requirements for the deep mines of that company. The writer also raises the question as to where adequate supplies of such materials will be found in the future and points to the yearly planting program as one approach to solution of this problem.

One of the tangible results of the deep interest which the mining operators have in these problems, is the survey now under way by The American Forestry Association in Ohio, Illinois, Pennsylvania and West Virginia. Under direction of John Tillinghast, a study is being made of consumption and present and future supplies of timber needed in the bituminous fields of the states named. Coal mining makes use of many species in a great variety of sizes and shapes. In this large and steady market, there is real opportunity for landowners to practice intensive forestry profitably.

Secrest was appointed state forester in charge of the newly created Division of Forestry, a separate unit, still under the Experiment Station. He held this position until 1937, when he became director of the Ohio Agricul-

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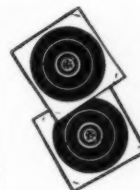


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tural Experiment Station, which position he still holds.

Secrest's 40 year tenure in forestry work of the state is not only a record of personal accomplishment but exemplifies the stability that has pre-

of Forestry. More than 80 percent of this sum is for the purchase of land best suited for forestry. This program of land purchase by the state coupled with the U. S. Forest Service program in southern Ohio should go



Pasture and woodland regions contain three-fifths of Ohio's forests. The rest is in the corn belt and dairy area

ailed in this department. Its record of management of state forests, supplying nursery stock for a large part of the 90,000 acres that have been re-forested and maintaining effective fire protection to the limit of its resources has been due to sound public policies and interest. A recent example of this interest was manifested last year by the legislature which appropriated \$1,877,000 for the Department

far to meet the public's part of the state's forestry program.

The Ohio forestry picture is bright, yet it must be remembered that 95 percent of the forest land is in hands, mainly in the form of farm woodlands. It is in these that better management practices are needed to raise the productive level and thus balance the hardwood timber budget of the Buckeye State.



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Birds

(From page 262)

from prying hungry eyes. Perhaps the most brilliantly dressed bird that helps to incubate is the red-breasted grosbeak. His presence makes the nest conspicuous.

Strangely enough, the young of the secretary bird, a bird of prey, do not leave the nest for five or six months after they are hatched.

Perhaps, in these days when houses are so hard to find and homes so difficult to maintain, we could learn a lesson from the birds. In many ways, with our superstitions, our ingenuity, our instincts, we are their fellow citizens of this world in which we live. They have wings to fly; we have legs for walking. We speak our language; they sing theirs. They are creatures of the clouds and sunlight and aerial stairways beyond our natural realm. We are but plodding mundane humans. But when the questions of home building and rearing children arise, the Creator came pretty close to giving mothers and fathers the wide world over a kinship that springs from the heart, even if it lies beyond the understanding of the animal brain.

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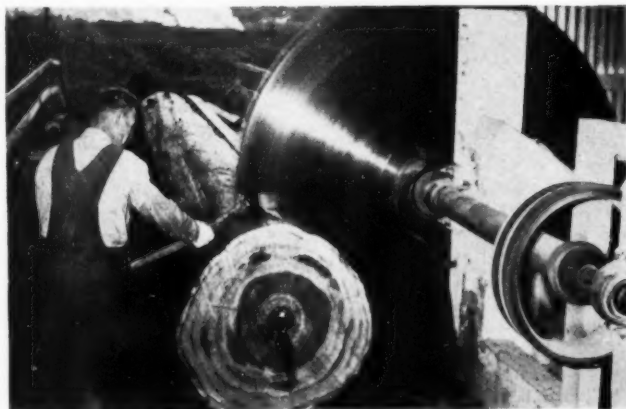
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CINCINNATI 2



OHIO

AFA Directors Act on Pending Legislation

At the meeting of the Board of Directors of The American Forestry Association on May 6, the following action was taken in regard to major conservation legislation now pending:

S. 1990, to amend the Plant Quarantine Act to authorize the Secretary of Agriculture to limit the entry of foreign nursery stock to that needed for propagation purposes and, if necessary, to grow such stock under post-entry quarantine, was endorsed by the directors as a necessary measure to help protect American forests from further introduction of foreign disease and insect pests.

S. 33, relating to the management of national forest grazing lands (see "Conservation in Congress", page 282), was opposed by the directors because it denies the Secretary of Agriculture discretion in adjusting range privileges and may lead to establishment of vested rights in the use of national forest ranges.

S. 1863, which would provide federal assistance to the states in the prevention and control of outbreaks of destructive insects and diseases on all forest lands, irrespective of ownership, was approved in principle.

At its meeting on January 28, the Board of Directors took the following action in regard to legislation then and still pending:

S. 1156, to grant the state of New

Mexico certain public lands for the use and benefit of public institutions, was disapproved since it provided a means for the removal of federal grazing lands from the government's conservation program established by the Act of June 28, 1934.

Likewise, S. 1402, which would permit the dissolution of grazing districts if at least 60 percent of the users petitioned for their dissolution, was disapproved because it would establish a procedure to disrupt the regulation of grazing on the public lands of the United States.

S. 1634, to establish a natural resources policy, create a natural resources council, and provide for a natural resources inventory, was disapproved by the directors as involving the duplication of functions already being carried out by existing agencies. The inventory features of the bill were endorsed.

Two other bills were discussed at the May 6 meeting—H. R. 6201 to create the Franklin Delano Roosevelt Memorial Redwood Forest; and H. R. 6221 to further the conservation and proper use of publicly and privately owned forest lands. (See "Conservation in Congress", page 282.) Because of the many and far reaching provisions in these bills, they were referred to the Board's Committee on Forests and Land Use for further study and a subsequent report.

Moves to Boost Lumber Production

A program expected to result in the production of more than a billion board feet of lumber has been announced by the U. S. Department of Agriculture and the National Housing Agency. The purpose of the program is to provide more lumber for housing in 1946 and 1947.

The plan includes the construction

of access roads into government-owned timber not now accessible to loggers. While these developments would add only about 100 million board feet to the 1946 production, it is expected that they will result in an increase of 600 million feet in 1947.

A second point in the program is the awarding of contracts in cases of identical bids to those timber operators whose output will result in the maximum production of the materials needed for the housing and re-conversion program.

Further, the U. S. Forest Service will return to its wartime policy of permitting timber cutting on national forest lands in certain areas of the West and the South at rates in excess of current growth where it can be done with community support. Over-cutting will be permitted, it is indicated, only until the access roads are yielding large quantities of logs. The entire program is expected to raise production from 250 to 300 million board feet this year, and 650 to 800 million feet in 1947.



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New Weapons

(From page 287)

of pressure will be used for fog production, the high-pressure pumpers mounted on tankers where they can move in on roads or trails and lay a heavy extinguishing blanket, the low-pressure nozzles back in the woods, where portable pumpers and gravity lines are best employed.

The walkie-talkie, or light portable radio, as developed by the Army for field use, shows considerable promise in forest fire control work. It is particularly well adapted to use by scouts, but it has its limitations in rugged country and its high frequency waves often are lost in heavy timber.

The scarcity of radio parts during the war made it difficult for civilian agencies to expand their radio systems. Many states, however, have rather efficient radio systems linking towers with patrol cars, and men on the line with the fire headquarters. In the near future we should hear quite commonly of two-way voice transmission involving planes, mobile ground units, portable units and stationary installations.

The drive for greater lumber production during the war provided a real test for power-driven portable saws. These were not only used in the lumber and pulpwood camps of this country, but for a long time top priority was given to their shipment to the armed forces. These man-savers will speed up the job of snag felling and of clearing standing and fallen trees from fire lines. Here the jeep doubtless will be called upon to help provide the transportation of the saws, crews and power units.

Not all, or even a major part of this equipment will be ready in time to have widespread use in the 1946 fire seasons, and some areas will be slower than others to revamp their fire control programs. Foresters know how to fight fire by methods which have been proved to be effective over many years of hard experience. These will not be scrapped until the more adventurous of the fire chiefs prove the efficiency of the newer developments.

Mechanization is nothing new in fire control work. The American Indian's dragging of a wet buffalo hide behind his horse along the edge of a prairie fire was probably the first step away from hand labor.

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being made to design and test mechanization applicable to forestry. A joint committee has been established for this purpose by the Society of American Foresters and the American Society of Mechanical Engineers, a committee headed by David P. Godwin, assistant chief of fire control in the U. S. Forest Service.

Further, the Forest Service has set up a national equipment development program and regional equipment testing laboratories. The states, too, and the forest industries are moving seriously into the mechanical field, developing and testing and replacing equipment as rapidly as operating budgets will permit.

Dam for the Yangtze

(From page 265)

New York to a depth of two feet.

The dam will be the straight-gravity type, depending entirely upon its weight to resist the pressure of water behind it. It will be 2,450 feet long at the crest and require 15 million cubic yards of concrete. Total installed power capacity will be 10,560,000 kilowatts, more than three times that of Boulder, Shasta and Grand Coulee dams combined.

China plans to utilize this almost incredible power production to develop the resources of the valley, repay the cost of the dam, and to raise living standards in the area. The dam will turn the flow of the Yangtze through 96 Coulee-type 108,000 kilowatt turbine generators nested in tunnels drilled into the solid rock.

The United States, indeed the whole world, will be interested in this phase of the industrialization of China. The project is not without its economic and political dangers.

On the one hand, the availability of ten and a half million kilowatts of electrical energy will make possible tremendous industrial development—a development which can, unless guided carefully, mean the exploitation of low-cost labor such as enabled Japan to fill world markets with cheap gadgets at the expense of its people. If the power, and more importantly the benefits of the power, are concentrated in a few Shanghaies, the overall benefit to China may be considerably less than the potential value of the development. Purchasing power and foreign exchange may be concentrated in a very small area, with the net result that China's millions of farmers, 75 to 80 percent of her populations, will continue on their subsistence level, while the foreign exchange goes into the purchase of food from abroad.

If, however, China uses the vast potentialities of the Yangtze dam to establish decentralized industries in the farming communities, the general level of Chinese existence may

be raised to the point where all of China will reap lasting benefits.

The average Chinese farm is less than four acres in size. While its production per acre for many crops compares favorably with that of the United States, production per man is very low. Because of this, the farmer does little more than supply his own needs. With local consumer goods industries to absorb some of the manpower, to create low-cost industrial products, farm implements and conveniences, and bring to the farmer a portion of the return from farm product manufacture, the farmer will be able to raise his income or purchasing power and standard of living.

The reservoir created by the new dam will gather to itself the wild floods of the Yangtze now so destructive and expensive to the Chinese people. Not only will the flashy, lesser floods which may occur during any month of the year be controlled by the dam and its reservoir, but also the great flood-tide run-off occurring in the spring and summer months.

The second great benefit from the dam will be the provision of an adequate, reliable supply of water for irrigation. The soil along the river is extremely fertile and, if irrigated, should be productive.

Dr. Lowdermilk states that the project, however, can benefit the inhabitants of China only if they develop "agricultural efficiency" and adapt themselves to the correct use of land. China's agricultural efficiency, as that of other countries, will depend, he explained, upon the efficiency of her crops which includes the use of the best strains of plants for the farm site involved, the maintenance of high yields on each farmed acre, and increasing the yield per farmer. It is in the latter phase that the Chinese farmer is inefficient. His small acreage is farmed with primitive tools, generally without

automotive power, and often with little animal power. Even the small farms are broken into still smaller parcels of land, often widely scattered, so that the farmer spends a great deal of travel time in getting over his area.

A similar problem was solved in Russia by collective farming, but it can hardly be expected that the Chinese with their strong love of the land and their individual pride in land ownership will move in that direction. Nor will they sell their land on any scale large enough to permit individual owners to control and operate large tracts. In fact, ownership may tend toward smaller tracts as the farms are passed on to the sons of the present owners. Much can be done to aid the Chinese farmer through consolidation of his land area by exchange of land parcels. This is a slow process, however. And even when his total land area is resolved into one parcel, it will be too small, for most farmers, to be an effective economic unit.

The answer to China's farm problem, an answer which must be developed along with the rise in industrial might, appears to lie in cooperative farming, where individual ownerships will remain inviolate, but where community enterprise will make possible the use of modern agricultural methods of crop culture, harvesting and marketing. Such enterprises will not come about, however, unless the Chinese are shown, as others have had to be shown, that cooperatives are workable and will result in increased benefits to the individual small owners.

Aside from the benefits to be de-

rived from the project one of its most unusual features will be a ship-lock of revolutionary design. The conventional method of floating ships past the dam by means of filling and emptying locks is also to be provided. The new design will be a ship lift that will raise or lower loaded ships mechanically a distance of 550 feet. The lock is the brain-child of John Lucian Savage, consulting engineer, who says, "I'll be disappointed if no one says 'it can't be done'".

A 200-foot high tunnel through solid rock will lead ships from downstream into the lock basin at river level. While the ship floats in the basin, cables from gantry cranes straddling the top of the lock are dropped down and fastened to the hull. The crane hoists the ship above the dam, moves it along tracks until the vessel is suspended over the navigation channel and then drops it back into the water. Ships taking this lift will have to be especially designed and built with strengthened hull and frame, as ships of normal design, if suspended in this manner, would break or buckle.

The lock gates are as revolutionary as the main lock design. Huge in size, 200 feet high, they will operate hydraulically and when closed form a perfect steel arch dam. The outlet gates of the lock basin are designed to withstand the pressure of a 530-foot column of water.

The preliminary design work for the project is not expected to be completed before January 1948, but whenever the work is carried through, a China no longer oppressed by flood and famine in the Yangtze Valley may arise.

Texas Timberlands

(From page 278)

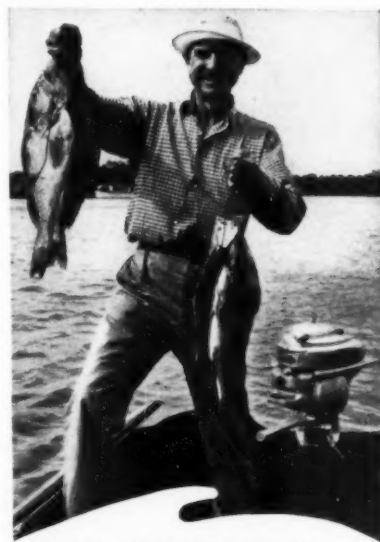
ber production is the story of east Texas.

Riding through these eastern counties one naturally compares today's forests with those of a decade ago. Certainly as much land is given over to tree growth now as was the case in 1936. At that time a few steam skidders were still at work in longleaf pine stands, and many more big hardwood logs (oaks, gums, magnolia, ash) and cypress, came out of the river bottoms than now. Loblolly and shortleaf pine stands occupy more ground today, perhaps, but the volume of wood on an acre is less and the average tree size is smaller. Today the cutting is lighter but more widely scattered.

Like the forests of most other sec-

tions of eastern United States, these stands are understocked, because they have been cut too closely in the past. Many large owners are trying to remedy this defect, but Texas today is growing only about one-half the wood volume that might be added each year. On certain state and national forests and industrial lands, growth is estimated at 300 to 350 board feet each year for each acre, yet the overall average for all lands is no more than 170 board feet. Twice as much sawtimber should be grown annually upon these splendid forest sites.

For the region as a whole, annual growth is estimated by the U. S. Forest Service to be 1,546,800,000 board feet of sawtimber, or 7,831,-



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100 cords altogether. From this total, 1,224,900 cords are lost by mortality. Thus, it appears that sawtimber is being cut faster than it is growing, while the balance is decidedly favorable when smaller trees are included.

If natural longleaf pine reproduction leaves much to be desired in density of stocking and area coverage, a measure of comfort may be had in the plantations of slash pine (*Pinus caribaea*) that have been made in many east Texas counties. From a first planting of this tree from the southeastern Gulf Coast, done 20 years ago, startling growth and financial return have been realized. Nine-tenths of planting now going on in east Texas makes use of this species.

However, it is also true that landowners in 50 or more counties outside the commercial timber belt have called upon the cooperative (federal-state) forest nursery at Alto for seedlings with which to plant windbreaks around farm buildings and soil conserving woodlands. A forest nursery for west Texas is in the plans for expansion.

In 1934, the federal government began buying cutover lands in east Texas for inclusion in national forests. A total of 654,000 acres has been acquired and eventually it is expected to bring the total to approximately double the present acreage. Much of the land bore substantial volumes of second growth, and already it is estimated that 65 million board feet of sawlogs may be removed for sale each year without impairing the forest capital of growing stock.

The question of how beneficial new national forests may be in a self-reliant state like Texas has been

argued during the past decade. Proponents of increased federal ownership point to the good management example set by Uncle Sam's foresters, to their protection results, and to the forestry enthusiasm they bring to the aid of state and other forestry workers. Somewhat irrelevantly, perhaps, they point as well to yearly contributions of \$75,000 or more for state use in fire protection, to wood procurement activities and storm damage recovery aids, to landowner education and especially to a field silvicultural experiment station recently established.

Opponents point to reduction of tax revenues in 10 counties, serious enough to threaten default of outstanding road and school district bonds in some. They state further that Uncle Sam's forest management is no better than that of the large private owners, that the lands bought at bargain prices a decade ago would be equally productive of timber today if in private hands. Also, it is claimed that the most valuable services now being rendered by federal experts or with federal cash contributions would be as readily available even though Uncle Sam had bought no Texas cutover lands.

State leadership will be provided on an expanding scale, and will make use of federal aids which are offered on a cooperative basis. At present seven state and federal foresters are working among farmers and other landowners. It is planned to build this force to 41 workers, largely with state funds. These men will be the spearhead of a drive to bring forestry to every forest acre in east Texas and to suitable areas elsewhere. In Texas, state forestry is definitely on the march.

AUTHORS and PHOTO CREDITS

JOHN L. BLACKFORD (*Trees of Bryce Canyon*) is both photographer and writer of Libby, Montana. ROY C. BRUNDAGE (*Forests of the Buckeye State*) was regional consultant for the Appraisal and is now a member of the faculty of the forestry school of Purdue University. VAN BEUREN W. DE VRIES (*A Dam for the Yangtze*) is a writer and producer at radio station WMAL in Washington. CHARLES ELLIOTT (*No Housing Shortage for Birds*) is director of the Georgia Game and Fish Commission. WALDO M. SANDS (*Oak on the High Seas*) is forest economist, Lake States Forest Experiment Station. JOHN B. WOODS (*Texas Timberlands and State Forestry*) is director, Forest Resource Appraisal.

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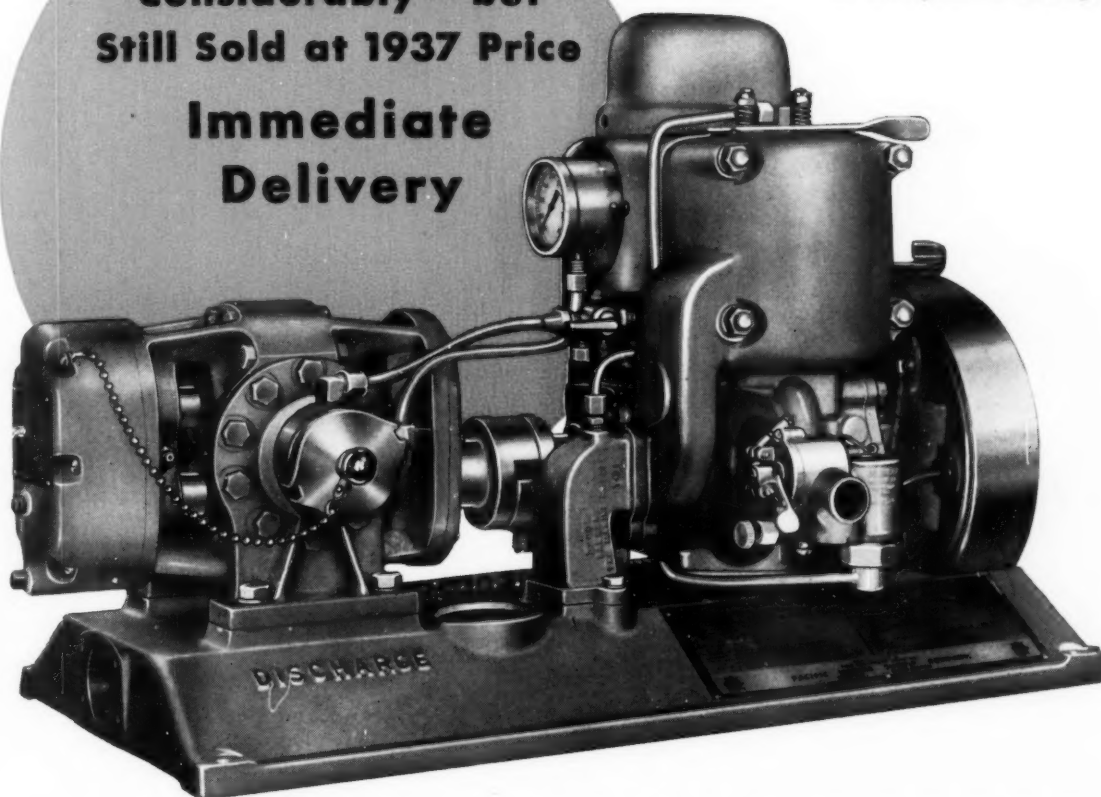
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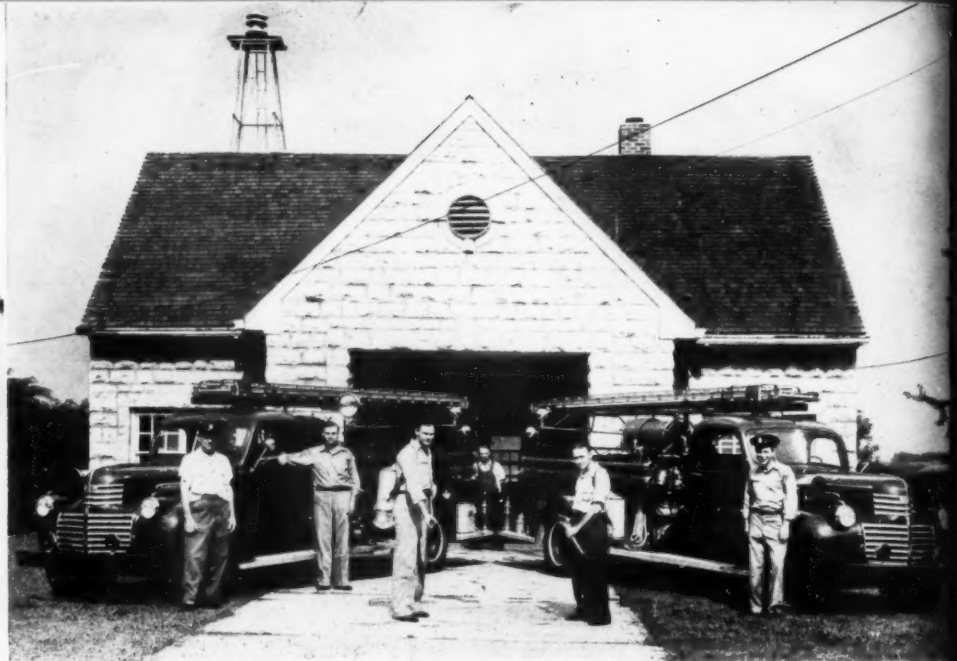
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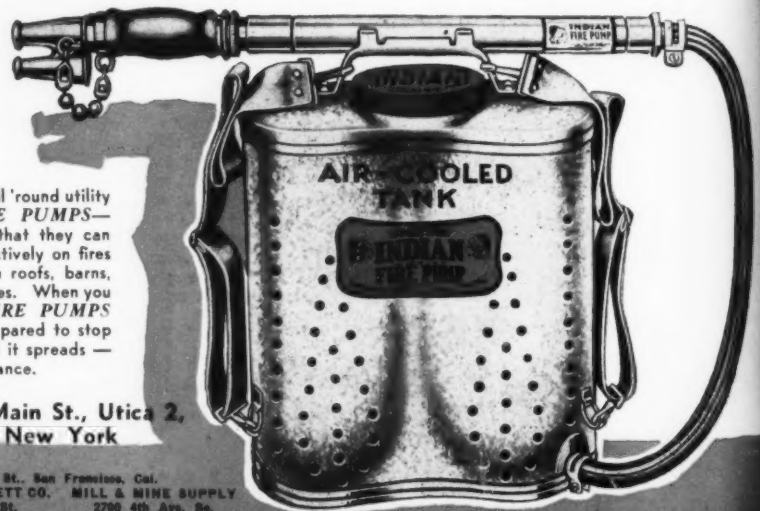
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